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and **REHABILITATION**

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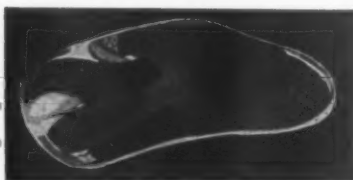
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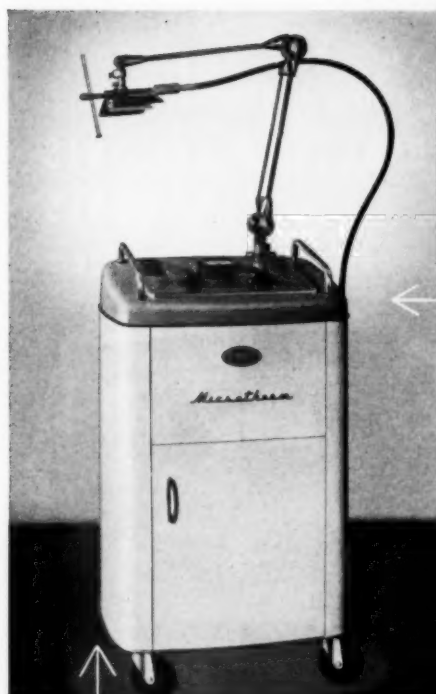
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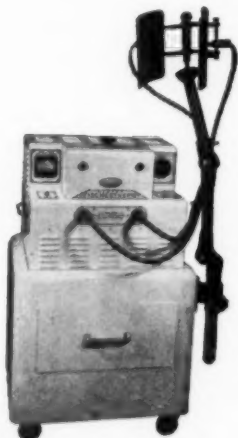
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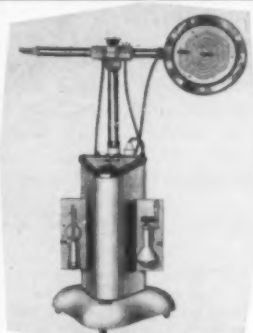
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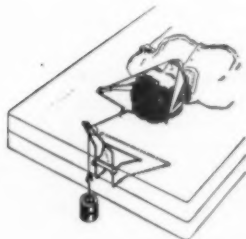
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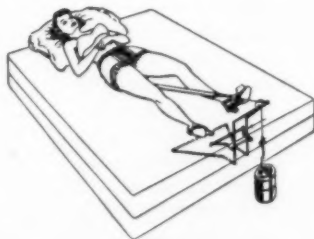


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The Liberty Mutual Rehabilitation Program

W. Scott Allan
Boston

More than a decade ago, the Liberty Mutual Insurance Company explored the possibility of taking affirmative action to restore to employment many patients who had previously been classified as permanently disabled. Careful review of a large number of their case histories revealed that, despite excellent surgery and apparent favorable progress during hospitalization, they often lapsed thereafter into long-term chronic disability. The reason lay in the fact that these injured workers suffered from residual atrophy or stiffness in the injured part, from discouragement or fear, from lack of counseling or vocational re-training and placement, and many times from as simple a thing as the need of someone to take an interest in them.

It became obvious that something was needed to support the progress of recovery from the end of surgical healing and definitive medical care until return to employment was possible. Study of existing facilities for physical restoration in the United States and Canada convinced the company that a service combining diagnostic study with physical restoration could do much to assist physicians in the rehabilitation of industrial accident cases. Valuable guidance and suggestions were forthcoming from interested specialists in the medical profession.

Liberty Mutual's management believed that it was not enough to protect the employees of policyholders from injury by reducing hazards and to compensate promptly those who are injured. A major function of an insurance company is to help reduce lost time and lost abilities by speeding the return to work of injured persons and to return them in proper physical and mental condition so that again they may be useful, self-supporting citizens.

It was the consensus that the need might best be met by a facility that would be specialized for the industrial accident case and would be under careful medical supervision. It could also

serve as a pilot center for research in the most effective therapy technics. Community facilities for rehabilitation of the industrial injury patient were inadequate or lacking in many areas of the country at that time. Establishment of a center specifically designed to serve this type of patient might lend encouragement to the improvement or starting of comparable facilities at the local level by interested groups.

In June, 1943, the rehabilitation center in Boston opened its doors to the first patients. All types of injuries resulting from industrial accident were eligible for the coordinated therapy program. Gradual acceptance of its aims and practices led to the referral of an increasing number of patients from the New England area and later from other areas of the country.

The practical success of the Boston center, as well as the demand of the company's large volume of heavy industry business in the Midwest, gave rise to the selection of Chicago as the site for its second rehabilitation facility. The Chicago center was opened in February, 1951, and its operation is patterned on that of its predecessor.

These rehabilitation centers have been established to provide actual rehabilitation therapy at the earliest time medical judgment considers the patient ready for treatment. Referrals are made by the attending physician directly or through the rehabilitation nurses and claims representatives of Liberty Mutual with the complete approval of the attending physician. The services at the rehabilitation centers are designed to integrate several types of functional therapy in the interest of a better physical and vocational result for the patient and his physician.

Each center has its own consulting staff of physicians qualified in orthopedic

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Supervisor of Medical Service, Liberty Mutual Insurance Company.

surgery and experienced in the field of traumatic injury. All patients are examined on admittance in order that the exact condition of the injury may be known and the rehabilitation therapy correctly prescribed. Also on the staff are physicians qualified in internal medicine who give each patient a complete physical examination, including chest x-rays and laboratory studies. This is done in order to discover any conditions that might complicate recovery and to allow the staff to deal adequately with them.

The therapy program is functional in its direction and purpose, since restoration to work ability is its primary goal. Physical therapy utilizes the accepted modalities for heat, exercise, and massage, together with the standard exercising devices. Occupational therapy is built around a woodworking shop in which the patient selects his own project and builds it with hand- and foot-operated tools, under the skilled guidance of the trained therapist. The functional concept is even carried into the recreational therapy program where relaxing but practical games provide further use of the injured part. Work tolerances are carefully observed and developed until actual work ability has been attained. All patients are on a full, daily program that permits a more rapid progress toward the desired end result.

Counseling plays an important part in the patient program. After admittance, it is used as a means of orientation to provide understanding and gain cooperation; however, its more important function is in preparation for return to work and vocational testing and guidance. Nurses trained and experienced in the techniques of practical counseling work with the patient, his employer, or other prospective employers to return the patient to a safe and productive job. Outside agencies, both public and private, are used for aptitude testing or re-training for a different type of work.

The entire rehabilitation program is keyed to the need of the medical profession for a postsurgical complement in the case involving traumatic industrial injury. Its practical accomplishments are based upon patient motivation and inter-

est, restoration of confidence, a hardening to work ability, and the psychological "lift" that comes from group participation in a common interest and aim.

To January 1, 1955, a total of 3,616 patients had been handled by the Boston and Chicago centers. Of that number 3,101 patients (85 per cent) were substantially improved, and almost all of these were improved to the point of being physically able to work. Of the 3,101 patients improved 2,550 (82.1 per cent) actually did return to work, with about one-third returning to different jobs than those they had had before the accident. The average age for both males and females was about 44, and the average length of time from injury to admission just about 6 months.

On the financial side of the picture, Liberty Mutual has long recognized that human gain coincides with business gain, that maximum rehabilitation means minimum loss to industry in money cost and in lost production. A survey of 30 typical, routine industrial injury cases ranging from simple fractures to postoperative discs being processed by our Boston center indicates an average estimated saving in workmen's compensation benefits of about \$1,000. In the more dramatic cases of spinal cord injury, involving the services of a specialized hospital unit geared to the physical restoration of such cases and utilizing the services of our center as the final step in the ambulation and hardening process, an average estimated saving in workmen's compensation benefits of approximately \$20,000 and an average estimated saving in medical cost of just under \$80,000 can be demonstrated. All estimates of savings are necessarily predicated upon individual judgment as to what the future probabilities would be in terms of physical condition, work potential, and protracted cost, but we can say with certainty that very material savings in lost cost can be effected by rehabilitation of patients with industrial injuries. The reduction of temporary disability and permanent loss of function by a comprehensive rehabilitation program offers a real incentive for medicine, industry, and insurance companies to combine their efforts toward

practical rehabilitation of all potentially serious disability cases.

We are often asked by people interested in the rehabilitation field and in what we have accomplished by our company program whether we intend to open a whole chain of rehabilitation centers and expand our services further and further toward a complete company medical program. As mentioned previously, our primary purpose was to establish a pilot center for research that would prove the value of comprehensive services and would also encourage the improvement of comparable facilities at the local level. Both of these aims have been realized to a great extent and we look forward to the greatly expanded development of community rehabilitation centers and medical and therapy programs that will deal more and more effectively with the needs not only of the industrial injury case but also of traumatic cases generally and of problems more closely related to the area of chronic disease and congenital handicap. With the expansion and improvement of such community services, our company will undoubtedly find it more practical to refer the average patient with an industrial injury to a good center in his own community rather than to transport him some distance to our own. There may be areas of exploration for new ideas and new

technics in which our money and time can be more profitably spent in the years to come. We have presently undertaken the establishment of a rather unique combined service in conjunction with the Boston University School of Medicine and the Massachusetts Memorial Hospitals leading to the development of a specialized unit that will deal with the challenging problems of spinal cord injury, not only in the treatment of such cases but also in the research and teaching areas. In the next few years we should learn many things of great interest to our own organization, to medicine, and to industry generally that will prove advantageous in the handling of paraplegic and the quadriplegic patients, which constitute such a heavy burden from a care and cost standpoint at the present time. As we grow in the knowledge of rehabilitation and what it can provide, we are increasingly conscious that no one person, organization, or agency can deal effectively with the whole problem but that it is peculiarly a team operation that requires the thought, initiative, and action of a great many individuals and the close integration of services within any community to accomplish the desired end result. To the constant improvement of that result and the means to achieve it, we are wholeheartedly dedicated.

Circulatory and Renal Effects Following Transfusion of Human Blood and Its Components to Dogs. H. L. Conn; J. C. Wood, and J. C. Rose. *Circulation Res.* 4:18 (Jan.) 1956.

Renal and circulatory changes were noted in anesthetized mongrel dogs following transfusion of human blood and some of its components. Intracardiac and systemic pressures were noted, as was the cardiac output and renal function.

The dogs were transfused with whole blood, hemoglobin, human globin, human serum containing red cell stroma, and human serum containing red cell stroma with Antara added. The response to human blood and hemoglobin during a period when the left ventricular output was fixed was also noted.

The transfusion of human hemoglobin produced rather remarkable changes in that the systemic and pulmonic pressures were increased despite the fact that both the cardiac output and renal blood flow were decreased. Large amounts of hemoglobin were found in the urine as would be expected.

The authors postulate that the increased systemic pressure was probably due to increased peripheral vasoconstriction caused by hemoglobin. The decreased cardiac output was secondary to the increased peripheral resistance.

The other reactions were quite typical of the changes noted following transfusion of incompatible blood. The rationale and necessity of transfusing dogs with human blood and the value of the findings are questionable.

Training Program for Rehabilitation Center Administrators

Willis C. Gorthy
New York City

Many rehabilitation facilities can be characterized as small establishments concentrating largely on a single phase of rehabilitation effort. Usually their development has been through the effort of a dedicated individual who stresses the provision of service representing the special professional interest of the founder; however, this is not to say that these facilities have not made a great contribution to the welfare of the disabled.

The small number of patients and the singleness of purpose of the facility permit the person in charge to know intimately the problem facing each patient. He personally can prescribe for and follow the progress of each patient.

Throughout the entire history of the development of rehabilitation in this country, until now, only a few truly comprehensive rehabilitation centers have been established in the United States; however, encouraged by the new Federal legislation of P. L. 565 (the Amendments to the Vocational Rehabilitation Act), and P. L. 482 (Hill-Burton Act), the trend in center development will give increased emphasis to the construction of the comprehensive center. P. L. 565 defines such centers in these terms: "... through which is provided an integrated program of medical, psychological, social and vocational evaluation and services under competent professional supervision: Provided, That the major portion of such evaluation and services is furnished within the facility and that all medical and related health services are prescribed by, or are under the formal supervision of, persons licensed to practice medicine or surgery in the State."

Unquestionably, the example set by these centers will have an influence on those built through private financing. Furthermore, it is to be expected that existing facilities, presently limited in scope, will endeavor to expand so as to encompass a wider range of services. This trend toward centers with larger

capacity and a diversity of rehabilitation services, together with the need for the development of better community relationships, will require a different pattern of center management and administration.

It is clear that the administration of such centers becomes a full-time effort. Whether management of the center is assumed directly by a professional person or by a trained administrator, the fact remains that the successful development of a smoothly functioning facility will depend in large measure upon the management skill of the top echelon of the center.

Recognizing that the trained administrator would be called upon in the near future to play a more important role in rehabilitation center management, the Conference of Rehabilitation Centers in 1953 formed a committee, representative of professional and administrative elements of the membership, with the assignment to draw up recommendations for a training program that would fit qualified individuals for the role of administrator in the management of a comprehensive rehabilitation center.

With the passage of P. L. 565 it was possible for the Federal Government to give financial support to the Committee's proposals almost before the report was officially presented to the 1954 meeting of the Conference. The Institute for the Crippled and Disabled was asked to conduct the first training course. It began on February 15, 1955, with a limited class of 10 persons. The training is of seven months' duration and terminated on September 15, 1955.

The 10 persons were selected with great care from an original application list of more than 100. Qualifications sought were at least 3 years' experience

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Director, Institute for the Crippled and Disabled.

in one of the professional fields of rehabilitation or in administration, a minimum age of 30 years, and, possibly most important, desirable personality attributes such as feeling for leadership, personal stability, resourcefulness, and tact.

The group finally selected was composed of five men and five women from such fields as public health nursing, occupational therapy, physical therapy, vocational counseling, speech therapy, education, and business management. Trainees came from eight different states as far west as California and Washington.

Since they all had professional backgrounds, the training problem was essentially to give them a solid grounding in over-all management concepts, administrative techniques, the fundamental of community planning, and the like; however, orientation in the principles of total rehabilitation was not neglected since none of the trainees had had actual experience in a comprehensive rehabilitation center.

Training was achieved through classroom instruction at the Institute by experts from the various rehabilitation professions, from management, and from administration. This was interspersed with three 7-week periods of on-the-job training at selected rehabilitation facilities in the East and Midwest. These

placements were selected to provide a variety of experiences varying from the large in-patient center to the small community out-patient facility.

As the training program came to a close, the change in the viewpoint of the trainees was remarkable. They came with an attitude that management is a simple subject and that the skills required are in-born in every human being. During the first 3-week period of orientation, this attitude changed to a sort of bewilderment at the complexity of the management problem and the many sides to the operation of a comprehensive center. As one trainee put it, "By the time we were to start on our first on-the-job placement we were filled with misgivings as to our ability to function in the administrative field." But a feeling of confidence developed as they were able to learn from their experiences and to apply their training to the problems they faced. In almost every instance the trainee was able to contribute something of value to the facility to which he was assigned. This group of trainees grew in competence during the training period. They possessed at the end of 7 months an ability that many present center administrators acquired the hard way over a period of many years.

Assessment of Therapeutic Agents in Rheumatoid Arthritis. L. Mandel. *Canad. M. A. J.* 74:515 (Apr.) 1956.

The author in this study attempts to find suitably controlled methods of assessment of the value of therapeutic agents in rheumatoid arthritis. He points out that the value of certain agents has been greatly obscured in past studies, because methods of evaluation were so poor. Six methods of assessment were used:

1. A general clinical assessment by the observer.
2. An assessment by the patient who was asked not to reveal his figure until the observer reached his own conclusion.
3. A determination of activity index, using both subjective, e.g., pain and tenderness, and objective criteria, e.g., erythrocyte sedimentation rate and hemoglobin.
4. An estimation of functional capacity by observing activities of daily living.
5. The use of instruments, e.g., a sphygmomanometer to measure joint tenderness when inflated over a joint.
6. Estimation of erythrocyte sedimentation

rate (Westergren method) and hemoglobin.

To determine the degree of association between the methods used, correlation coefficients (r) were calculated. These were determined for series of corresponding values of clinical change as recorded by the observer and changes as recorded by each of the other methods of assessment in turn. There was a highly significant correlation between almost all of these methods of assessment and the observer's clinical assessment. The highest correlation coefficient was that between clinical change as assessed by the patient and that as assessed by the observer. This, of course, suggests that the patient's evaluation of his condition is closely related to that of the observer and thus may be of considerable significance.

Methods of assessment will depend on the rapidity of the action of the agent under trial and its local or general use. Whatever method of assessment is used, it is best when using controls to employ the double blind system in which the identity of the inert substance and agent is unknown to both patient and observer.

Business Practices in Rehabilitation Centers

Arthur A. Rodriguez, M.D.
Chicago

This discussion will be limited primarily to the matter of establishing proper fees for services rendered at rehabilitation centers and to a review of some of the fees prevailing at the present time. Fees for rehabilitation services, at least for some centers, represent their major source of income. Whether or not these fees can completely sustain the center depends upon many factors. Certainly, large centers having all the rehabilitation services cannot be self-sustaining for years because in the first years much of the services are dead weight. To the extent that each of the services is utilized to its full capacity, the center becomes self-sustaining.

We have, in our own experience, demonstrated that an out-patient center providing medical supervision and physical, occupational, and speech therapy as needed, and integrating available community resources for psychological, prevocational, and other services, can be self-sustaining. It does so at a very reasonable fee to the patient. But this is a different type of center from the one mentioned previously.

Fees should be established on the basis of the actual cost of treatment. The cost of treatment depends upon the direct labor required, the overhead for the time the patient occupies a booth or space in the department, and the cost of equipment used.

The direct labor is the time a therapist actually spends on the treatment of a patient. The cost of direct labor is computed by multiplying the average productive hourly rate by the amount of time consumed in the treatment by the therapist.

The average productive hourly rate is obtained by dividing the average total monthly salary of the therapists by the monthly productive hours. The monthly productive hours are assumed to be 70 to 80 per cent of the total hours for which they are paid. This assumption is justified on the basis of vacation with

pay and sick leave with pay, unexpected cancellations of treatment, and other unforeseen factors, which reduce the normal work efficiency of the therapist. For example, in giving a diathermy treatment, the actual labor time involved, as noted by the time study, was 2.44 minutes or 0.041 hours. Multiplying 0.041 by an average productive hourly rate of, for example, \$2.86 would give a labor cost of \$0.117 for this relatively simple operation.

Overhead expense is made up of cost of medical supervision, janitor service, linens, telephone, bookkeeping, rent, power, light, and all other expenses of operating the clinic with the exception of direct labor and also with the exception of depreciation, maintenance, and repair of equipment. In order to determine the hourly overhead rate the total number of patient hours that will have to absorb this overhead must be computed first. If a department, for example, has an average patient load of four patients per hour, assuming an 8-hour work day and 5½ days per week, there would be 762.6 patient hours per month to absorb the overhead expense. The monthly overhead expense is divided by patient hours per month in order to obtain an average hourly overhead rate. This rate is multiplied by the time that a patient spends in the clinic to give the overhead expense for a particular treatment.

Allocation of the overhead on the basis of the patient's occupancy of space and time is imperative inasmuch as a significant portion of the patient's time in the department requires no direct labor. Even though the patient may not receive the direct ministrations of the therapist for a given period of time, he actually utilizes all the other facilities of the particular space and time he occupies. It

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would be ridiculous to charge for a thermotherapeutic application on the basis of direct labor alone. Such patients take space, bookkeeping, linens, telephone, insurance, power, light, and practically everything else necessary to provide the indicated service.

Equipment expense is made up of a relative portion of furniture in the department's reception room, the leasehold improvements, the cost of the booth installations, tables and lamps, and the equipment used in the treatment. In computing this cost an average life is assigned to each article and the cost amortized over this period. Maintenance and repair costs plus 100 per cent of the amortized cost and maintenance and repair allowance are added. Equipment expense per year is then divided by the normally anticipated or actual hours used to give an hourly equipment cost. An average figure for equipment per patient is then obtained in an effort to spread this cost evenly over all patients, or else this equipment cost may be applied to each patient in accordance with the cost of the equipment actually used. Actually a compromise between these two approaches is in order, applying the principle of putting a floor underneath and a lid on top of the charges in order to make necessary treatment financially available to the greatest number of patients. Through the application of these principles the actual cost of a prescribed treatment can be estimated as follows:

Treatment

Whirlpool — 20' to hips and legs at 103°.
 Massage — gentle to moderate stroking and kneading, both legs, 15'.
 Exercises — stretching to hip internal rotators, adductors and flexors, and to knee and ankle flexors. PRE to both knee extensors. Gait training.
 Occupational therapy — To train in indicated daily living activities.

Time Elements	Time	
	Min.	Hr.
1. Patient prepares for treatment ...	2.41	0.040
2. Patient positioned into and removed from whirlpool	2.17	0.036
3. Whirlpool	17.95	0.299
4. Massage	16.87	0.281
5. Exercises	10.33	0.173
6. Prepares to leave booth space to go to different treatment area ...	2.17	0.036
7. Occupational therapy	40.00	0.667
Total	91.90	1.519

Items 2, 4, 5, and 7 involved direct labor of a therapist and should be tallied and applied to their hourly labor cost; items 3 and 6 involved the use of treatment equipment cost; and finally, the total time spent at the center by the patient is applied to the hourly overhead cost:

Labor cost	1.144 hr. at \$2.50	\$2.86
Equipment cost	0.966 hr. at \$1.00	.97
Overhead cost	1.519 hr. at \$2.50	3.84
Total Cost		\$7.63

With the help of data from Dr. Nila Kirkpatrick Covalt obtained from 12 facilities, prevailing charges were studied from a total of 24 centers that are scattered geographically, thus various sections of the States are represented. In general, those facilities that had no medical direction listed their charges according to modalities; however, many of those having medical direction also listed charges according to modalities. Centers actively providing partial or total rehabilitation services have developed a simplified per diem charge.

Thirteen of the facilities reported a charge for examination and evaluation. Most of these included physical examination and physical medicine tests as part of this service. The minimum charge listed was \$10.00 and most listed a range up to \$25.00. One institution listed a minimum charge of \$50.00 but included routine consultants and psychological testing in their examination and evaluation service. The \$25.00 charge was the most common. Charges for special tests or special consultants were generally listed separately from the examination and evaluation charge. Speech and hearing evaluations varied from \$6.00 at one center, to \$10.00 at three centers, and \$35.00 at another.

Eight of the facilities listed charges for modalities. These varied from \$1.50 to \$4.00 exclusive of the Hubbard tank and of general body massage. Six of the facilities listed a charge of \$6.50 to \$10.00 for general body massage. Combinations of three modalities applied to one area of the body were listed at from \$4.00 to \$7.50 (two were \$4.00, two were \$4.50, one was \$5.00, one was \$5.50, one was

\$6.50 and one was \$7.50). To two parts or more it ranged from \$4.50 to \$8.00. Fourteen institutions listed their treatment charges on the basis of time alone. The minimum per diem charge is \$8.00 (two institutions are out-patient, one both). The highest was \$20.00 (in-patient). One institution (out-patient) charges \$15.00 for a full day (4½ hours), \$10.00 for a half day (2½ hours), and \$5.00 minimum; another charged \$15.00, \$8.00, and \$5.00 respectively. Four charged \$10.00 per day (out-patient).

The per diem fee is a simple and convenient way of charging. There is no reason why a center cannot determine the average cost of a program generally prescribed for a given type of disorder. For example, a preprosthetic training program or a hemiplegic rehabilitation program may be evaluated by means of a time study and an average cost based upon labor, overhead, and equipment

determined. Then, a charge based upon this cost may be made to all such patients as a per diem or package charge. The charge may not be 100 per cent accurate for each patient but should come quite close to the time treatment value. A general formula for determining the value of treatment was recently published.¹ This may be applied in most situations existing at most rehabilitation centers.

To keep costs down it is important that medical prescription and supervision of rehabilitation programs be competent. Such prescriptions should limit therapy to its essential ingredients, eliminating unnecessary expenditure of services. Overlap and duplication should thus be avoided and costs kept at a minimum.

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Integration of a Center Program With Community Agencies

William F. Stearns, A.M.
Saranac Lake, N. Y.

Integration of services is the cornerstone of the modern rehabilitation center. It can be viewed from two aspects: the "intramural" and the "extramural." The first relates to the application of orderly and purposeful medical, psychological, social, and vocational technics within the center itself in varying combinations to meet the needs of the patient as revealed by comprehensive, continuous, and dynamic evaluation. This is the integration within the walls, which is accomplished through autonomous institutional action.

The second involves correlation of center services with resources outside the walls to assure full use of community agencies in assisting the patient to achieve his rehabilitation objective most expeditiously and completely. It is this aspect of integration that also enables the center to play an especially important role in strengthening the entire community fabric of rehabilitation services. It is accomplished through cooperative interagency action, instigated by the center on behalf of the patient.

Effective integration of a center program with community agencies is dependent upon two fundamental principles. First, the center's policies are rooted in an awareness of current community needs and resources, reflected by development of direct services inadequately available elsewhere; prestige factors and a dead hand of institutional tradition are not allowed to dominate social responsibility and responsiveness. Second, the center is nonproprietary in its attitude toward its patients; it is solely concerned with their restoration to a useful and satisfying life, whatever the means utilized, whether within the center or through another agency. The patient looks to the center as a direction finder covering the entire range of community rehabilitation resources. To vindicate his faith requires an objective evaluation of all related facilities and ready referral to them when indicated.

Increasingly the establishment of rehabilitation centers is contingent on preliminary study of community resources and needs; integration with the services and intentions of existing agencies starts, as all things should, at the beginning. However, many centers sprung into existence during the pioneering days before the movement gained form and stature to meet specific needs then inadequately served. Since their founding, new laws have been passed, new institutions have come into being, medical progress has been accelerated, social and economic changes have been wrought, and the matter of integration with community agencies, in terms of present needs, requires reevaluation of purposes and programs.

It might prove ineffectual to state categorical principles unsubstantiated by clinical evidence. Thus, the following case history of a rural rehabilitation center, now in its 21st year, will have the virtue of authenticity and illustrate methods whereby, in one instance, integration of a center program with community agencies is being hopefully cultivated. Application of the principles involved may be considered characteristic of modern center practice.

In 1935, the village of Saranac Lake was world-renowned as a center for the treatment of pulmonary tuberculosis. More than 1500 patients were under care in 40 local private and public sanatoria. Bed rest, good food, and fresh air were the basic elements of prescribed therapy. This prescription was proving relatively successful in arresting disease and restoring bodily health; however, the attendant prolonged confinement too often induced or accentuated psychological, social, or vocational problems that not only preyed on the patient's mind during treatment but also, after recovery, con-

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Executive Director, Saranac Lake Rehabilitation Guild, Inc.

stituted serious handicaps in readjustment to home and community, and enhanced the likelihood of relapse. In an effort to provide a specific for these ills, the Saranac Lake Rehabilitation Guild was organized to "promote and stimulate interests of an educational and recreational character as aids to physical rehabilitation." To help determine needs and interests, a survey of the patients was conducted under the auspices of the local medical society. A founding grant was secured from the Carnegie Corporation of New York. A corps of instructors was recruited and an educational program initiated in a variety of diversional, cultural, prevocational, and vocational subjects, both at the bedside and in centrally-located classes. Integration with community agencies was mainly effected through an exceptionally active board of directors, representing all aspects of village life, with a physician as president. In 1938, the state department of education, upon recommendation of the local superintendent of schools, offered professional and financial assistance. In 1945, a counseling service was instituted in response to demonstrated need. Later a sheltered workshop, sponsored by the Altro Work Shops of New York City, was installed to build work tolerance while treatment was still in progress. By 1951, the founders of the Guild felt that they were finding the answers to many of the rehabilitation problems they had attacked 15 years before. In the meantime, medical science and public health programs were reducing the incidence of tuberculosis, were shortening the average period of treatment because of earlier diagnosis, and had introduced the era of drug therapy. Decline in the importance of Saranac Lake as a cure center was foreshadowed.

The Guild directors recognized the necessity for reevaluation of purpose and program in the light of changed conditions. They found that, in meeting the needs of the patient with tuberculosis they had developed psychological, social, and vocational services that could readily be brought to bear on problems attending many types of disability. Only through the absence of medical facilities

was the program lacking the well-rounded professional character of a comprehensive rehabilitation center. By coincidence, at this time a young specialist in orthopedics, familiar with the modalities of physical medicine, was building a flourishing practice in the village and the surrounding area. He cited to Guild officials the urgent rehabilitation needs of his patients. After consultation with officials of the district health office, and on-the-spot conferences with representatives of state and federal offices of vocational rehabilitation, in 1952 the Guild established a new department, with physical and occupational therapy facilities, a medical supervisor, and consultants in orthopedics, internal medicine, and psychiatry. Later a consultant in physical medicine was added. The new services were integrated into the old and, as the tuberculosis case load has decreased, the nontuberculous has grown. The transition has been marked by adoption of a revised charter, acquisition of a dispensary license from the state board of social welfare, affiliation with the local general hospital, and a contract with the state department of health.

In January, 1955, the Guild applied to the Federal Office of Vocational Rehabilitation for a special project grant to conduct a demonstration of methods of providing comprehensive rehabilitation services to rural residents, on the basis that such a project might contribute significantly to the solution of vocational rehabilitation problems in several or more states. The first year of the project, now in progress, is concerned with a study of the rehabilitation needs and resources of the nine predominantly rural northern counties in the state of New York. The findings will be the basis for the actual demonstration of services in subsequent years, contingent on renewals of the grant. The state department of health has allocated the necessary local matching funds. By agreement, the study will be under the immediate supervision of the Medical College of the State University at Syracuse, located on the periphery of the area included. A steering committee, composed of representatives of public and private agencies, meets to

review progress monthly. Through this project, the Guild not only hopes to find answers to its own questions relating to extramural integration of its program but also to devise rehabilitation procedures that will prove effective generally in rural areas.

The experience of the Guild has been offered as an example of integration of center programs with community needs and resources. What of integration with reference to the actual treatment of patients?

The first link in this integration process is customarily established at time of referral from the community to the center. This link is not broken on admission but is constantly strengthened as others are added to it. Sources of referral, in addition to private physicians, include hospitals, public health services, social agencies, insurance companies, compensation boards, unions, industry, welfare bureaus, divisions of vocational rehabilitation, schools, and voluntary associations. The referring agencies are included continuously in the rehabilitation process through reports of progress from the center, written recommendations, and joint conferences. Thereby the center demonstrates its nonpossessive attitude toward its patients. While it ac-

cepts responsibility up to the limit of the original request for service, it does not proceed beyond it without clearance from the referring source and, if feasible, involves the agency in the progressive planning process. As the desirability for making use of other community resources in the rehabilitation plan is indicated, the center recommends and facilitates such use on the basis of its familiarity with them and its ability to integrate them smoothly into the patient's program. Particularly at the time of discharge is this of critical importance, whether related to continuation of service, placement, or follow-up. The success of the transition is dependent upon willing participation by the patient, his family, and the receiving agency, based upon full understanding of the problems involved and the objectives sought. Such participation is assured by the center, before discharge, in fulfilling its role of coordinator of community resources in the treatment of its patients.

The rehabilitation center represents a powerful instrument for social and individual progress. Whether in social planning or in the rehabilitation of patients, the center draws strength from the integration of its program with related community services.

Axon Sprouting in Partially Deneurotized Nerves. G. Causey, and H. Hoffman. *Brain* 78:661, 1955.

The production of collateral and ultraterminal outgrowth of fibers from the intact nerves under conditions of partial denervation of skeletal muscle has been well established. These outgrowths have been shown to take place usually from the nodes of the terminal millimeter of the motor axon.

The level of sprouting of new axons from the nerve trunk was determined by partially deneurotizing the sciatic nerve in a strain of hooded rats and examining a portion of the nerve at intervals of 24 hours to 21 days after deneurotization. The normal sciatic nerve was used for a control and the sections were examined by electron microscopy, the material

being fixed in Palade's buffered 1 per cent osmium tetroxide.

As early as 24 hours after operation, groups of tiny (from 0.1 micron upwards) fibers were seen lying between surviving myelinated fibers. Sprouting was noted along the entire course of the nerve except at the root level. The diameter of the fibers increased with time but never exceeded 2 microns in diameter. The failure to mature may have been due to inability to form terminal connections.

No studies were made after 21 days because of the chance of mistaking regenerating fibers from the proximal stump for collaterals. This factor is of utmost importance in that the true significance of the sprouting, whether these fibers ever assumed or could assume any functional significance, was not determined.

The Chronically Ill and Aging— The Physiatrist's Responsibility

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Responsibility for the chronically ill and aging has been assumed by the members of the medical profession, but the scope of their care of these people still leaves much to be desired. Only recently has this facet of medical attention finally reached the curricula of the medical and allied schools. It will be considerably longer before the specialties come to the realization that they have a specific devoted obligation to expand the boundaries of this phase of medical care.

Physical destitution begins with old age, injuries, or illnesses. The starting point is usually the home; the general hospital is frequently the first stop after a debilitating episode. Unfortunately, few private institutions, except those in larger centers, have departments of physical medicine; even fewer have any semblance of rehabilitation. Only rarely can smaller hospitals afford the services either of a physiatrist or therapist. As a result, the dynamics of physical restoration bog down at the most critical point and time—in the general hospital when medical care is started. Herein, then, begins the descent to chair or bedfastness, culminating in physical degradation. The need for hospital beds is always urgent, resulting in the physically dependent patient being discharged to his home.

It might have been true at one time that nursing and medical staffs had little or no interest in the chronically ill or aging patient, but this is not so today. Basic teaching now acquaints them with the ever-growing problems of these humans. But there is still a gap between active and definitive care on the one hand and the end point, rehabilitation, on the other. This hiatus must be filled by the physiatrist whose professional duty and devoted responsibility must breach this chasm.

Team Approach to Rehabilitation in a General Hospital

Much of this report is based on experiences gained at Presbyterian Hospital (University Hospitals) Pittsburgh, Pennsylvania; Allegheny County Institution District with hospitals at Woodville and Mayview, Pennsylvania; and the Veterans Administration Hospital, Pittsburgh, Pennsylvania.

At Presbyterian the admission of an aged or chronically ill patient sets in motion a chain reaction, the components of which constitute a closely integrated and faceted pattern. The staff at every level, recognizing the potentially long illness, makes its own team approach of medical or surgical consultations together with the social service staff. If and when the various data and professional opinions are available, the group meets to integrate each discipline and to assign to the required service its particular duty. An interesting out-growth of this concept has been the Paraplegic Rehabilitation Clinic, composed of members of the faculty of the School of Medicine, University of Pittsburgh; namely, an internist, the coordinator, neurosurgeon, orthopedist, physiatrist, plastic surgeon, and urologist. These professionals form the team that delves into the intricate management of the paraplegic. Definitive care having been provided, the expression of these services must be interpreted by the physiatrist and his staff in terms of completing the cycle of rehabilitation.

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Another simple illustration of team work in action is furnished by the diabetic patient with a cerebrovascular accident. Too often emphasis is placed only on dietary management, but what about the disability to the upper and lower extremities? To facilitate discharge and continued convalescence, two other mechanisms go into action. Social Services bring one or more members of the family to the hospital to be briefed by the patient's physician and indoctrinated by the physiatrist and his staff. At the same time the Visiting Nurses Association is also contacted and given the prescribed home care program. Thus the ring of good management is forged. Such a program reduces hospital stay (and expenses), making a bed available; utilizes professionals to teach nonprofessionals (the family); stimulates the patient to become a working member of his own staff, and joins forces with community resources. Progress reports are furnished to the physician-in-charge, the physiatrist, or any other member of the team so that activities may be charted, to be increased as needed. This, then, briefly describes an excellent, close-working relationship within the allied professions.

This chain of events may be broken by any untoward occurrence such as inadequate housing, poor arrangements, and misunderstandings; thus, further assistance for recovery is needed. Return to the private hospital may be unnecessary from a purely medical standpoint, or economically impossible, so that transfer to another facility is required. In this instance, admission to the county hospital follows, but the stigma of such a move provokes a depressing influence on the patient and family. Separation from home and intimates inculcates a "poor-house complex" and the fear of inadequate care in such an institution forebodes a dismal existence.

Team Approach to Rehabilitation in a County Home

Primarily, county homes were never intended for adequate medical care, but rather as refuges for the homeless, infirm, and aged. Gradually, additional respon-

sibilities of medical care were assumed, but few of these facilities were constructed or equipped for such purposes. At Woodville and Mayview, patients were assigned a bed upon admission, given nominal medical care, and there the matter rested; however, an enlightened administration, realizing the need for dynamic and drastic changes, evolved a physical medicine and rehabilitation service. This called for the team approach of medical and technical disciplines. Actually, neither the patients nor the diagnoses were different, but the concept of activity for such a place was radical. Therapists were scarce, but even more alarming and revolutionary was the heresy of attempting any restorative services with the "poorhouse" clientele.

Simple, inexpensive rehabilitative equipment was built and the program got under way. Well-accepted procedures of bed exercises, gradual sitting, and ambulation, followed by greater activities, were instituted. Interestingly enough, and without any deviation in medical care, many changes were evident. Incontinence, once considered a complication or a by-product either diminished or disappeared. More patients became ambulant, thus reducing nursing and allied services. Institutional apathy showed definite signs of disappearing. Many patients were imbued with a desire to return to their respective communities. Finally, the discharge rate increased vastly, but even more importantly, a new idea was born: Not "over the hill to the poorhouse, but down the road to rehabilitation."

What then made the difference between the old and new poorhouse concept? We believe it is in the philosophy of the care of people. Formerly, the patient was considered to be merely waiting out his remaining days; therefore, it was felt that little could or should be done for him on any plane — medical, social, or spiritual. In the present philosophy the patient is regarded in his entirety and his rights as a human being recognized and understood. To meet these rights, every possible help is given, not only to provide the animal necessities of existence but to utilize the talents of all medical abilities to furnish the

comforts and happiness to which every human is entitled. It is a substantiated fact that this simple concept of physical restoration has been duplicated many times throughout this and other countries, to the benefit of the chronically ill and aging.

One final point should be stressed regarding personnel. Tax-supported institutions with fixed overheads are usually inflexible and do not permit, for budgeting reason, too many professionals. For this reason, attendants (aides, orderlies) were given training in teaching bed exercises, ambulation, getting in and out of bed, self-feeding, and other activities of daily living. Thus, the number of physical therapists required was kept to an absolute minimum and these professionals are free to direct more personalized attention to specific problems. All of the activities of the nonprofessionals have been checked by the physiatrist, therapist, and physician-in-charge and rarely have we found any untoward or detrimental effect. Actually, using aides, attendants or orderlies to assist therapists is not unlike the practical nurse helping her professional counterpart. We believe this should be given wider consideration.

Team Approach to Rehabilitation in a VA Hospital

In October, 1951, Doctor Peter Volpe, a physiatrist and then manager of the Veterans Administration Hospital at Aspinwall, Pennsylvania, wrote an office memorandum entitled "Plan for Aiding and Rehabilitating Hospital Patients with Long-Term Illnesses." A functional committee, the most important for our purposes, comprised the physician-in-charge, nursing and social services, physical medicine and rehabilitation, contact, special services, and dietetic. This committee by its nature combines the corps of specialists with delineated responsibilities, but this program goes even further in that discharge from the hospital is not the only end point. Contact and association with community services and voluntary agencies make for continuing relationship.

It is interesting to note the length of hospital stay per patient compiled from

the inception of the program late December, 1951 to July 1, 1955. From January through June (1952), 21 patients averaged 28.55 months' stay; from January through June (1955), 13 patients averaged 7.23 months. This disparity points out that when a concerted effort is made to investigate and combat the stagnation of chronic illness, there is visible evidence of progress. Unquestionably, the patients who were cared for in the past few years were little different from those of preceding years; therefore, one might ask why there was such a reduction in hospital stay. Certainly the prime factor was never to "clean out" the institution. It is our belief that these statistics reveal that the physiatrist and his staff must have assumed their rightful responsibility. It must be understood that all the specialties of this team performed their professional duties proficiently, harmoniously, and concertedly. Expertness in their respective fields was transferred into tangible activities of daily living by the physiatrist and his staff. Thus, we cannot escape the obvious fact that the physiatrist must assume the role of expeditor in coordinating all of the efforts of the team in the final work of rebuilding the chronically ill patient. Each member of this team is equally important in the final transformation of the patient from physical dependence to self-sufficiency.

Miscellaneous Observations in Public Institutions

The problems encountered in both county and Veterans Administration hospitals are quite similar, except that Veterans Administration hospitals are, as a rule, better equipped to fulfill the functions for which they were intended. For this reason, many observations regarding physical restoration, or rehabilitation, have been made in both institutions:

1. This "third phase of medical care," if made attractive, needs no selling to the patient. Insistence is of no value; winning over one patient in a group, even by subversion, may act as an exemplar to the others.
2. Amputees must be able to use crutches for ambulation before they

are considered for a prosthesis. Even those whose stability is questionable or whose physical state is inadequate may use a pylon, if only for the sensation of balance with two lower extremities.

3. Incontinence by habituation, particularly in patients who have had a stroke, is studiously avoided or corrected by starting bedpan training. No compromise is accepted in this respect since nothing stigmatizes the adult human worse than the inability to cleanse himself.
4. Grouping restoration candidates is highly desirable since competition improves results.
5. In fractures of the femur, open reduction followed by early ambulation has proved most successful in our orthopedist's hands. In our opinion, the primary justification for early surgical fixation is early ambulation.
6. Arthritic patients, irrespective of the etiology of their disease, are taught to employ, with improvisations, any or all means of using the parts of their body, regardless of whether they are sitting, lying, or standing. Stagnation followed by activity often causes discomfort and pain, but the personal satisfaction of self-accomplishment becomes a powerful antidote.
7. Despite the gloomy outlook for improvement of multiple sclerosis, malignancy, or other such hopeless problems, some form of physical activity is utilized and, strangely enough, accepted by the patient with alacrity and gratitude.
8. Finally, where large numbers of chronically ill and aging persons dwell, nonprofessionals are invaluable. We have demonstrated this principle in the County Home and Hospital. It is our contention, therefore, that rehabilitation as practiced in large institutions and hospitals is in reality mass physical restoration of a group of patients hitherto deprived of it inadvertently.

Role of the Nonprofessional Aide

With therapists short in supply, the attendant-aide-orderly group becomes a

source of helpers. In county homes these people may become either confidante or jailer, depending upon the consideration given them. Drawing upon World War II experience, we began to use nonprofessionals, choosing carefully those who had the philosophy of human decency toward their charges. Over the past several years our confidence has never been violated. These orderlies, who have more and closer contact with our charges, perform the menial chores expected of them, yet they have provided us with a reservoir of assistants.

There are, of course, economic considerations in both private and tax-supported institutions. As a rule, budgeting bodies and boards of directors frequently look for means to reduce financial outlays; as a result medical services suffer. However, not only the public but all professionals concerned gradually are becoming aware that better medical care is urgently necessary because of the vast number of patients who require it.

A Unique Rehabilitation Facility

For the past 8 years the Commissioners and Director of Allegheny County Institution District have had under consideration, and now have under construction, a new facility for the chronically ill and aging. Virtually every modern or near-modern institution has been visited to obtain the best in planning.

This new structure has several unique features. A complete floor of the hospital is devoted to rehabilitation, including special wards with integrated units throughout the whole institution. A modified colony plan is carried out in the ambulant section, providing for the congeniality of small groups despite the immensity of this project. Since fresh air, sunshine, and lawns are enjoyed, as well as being beneficial, the rolling terrain is utilized to provide direct ground access for 1100 patients. The most striking innovation is a centrally located recreational center highlighted by a multi-level auditorium that can be entered from four different floors without using ramps, stairs, or elevators. Recreation facilities will be provided throughout and a chapel for all denominations is provided for

patients and personnel of the institution.

This public facility has sponsored another innovation in the direction of education for patients who desire it. WQED, an educational television station in Pittsburgh, is providing a periodic course of instruction for persons who are either home-bound or hospital-bound and previously never had an opportunity for such learning. This project is intended not only for self-gratification but also to give the people concerned the idea of association with education in the outside world. This program is carried out at the Veterans Administration hospital, as well as at the county hospitals. The response at Woodville, Mayview, and the Veterans Administration hospital has been extremely gratifying. Among our patients are retired school teachers and many others with college backgrounds who have become a quasi-teaching staff of this television station. Those people who have participated in educational techniques reveal a revival of a latent talent brought to the fore by the expediency of using a television screen for a blackboard.

Role of the Psychiatrist

Those of us who have dealt with the chronically ill and aging in private and public institutions realize that there resides a challenge as well as a reservoir of material for human betterment. At least in the institutions named in this report, every conceivable technic in medical service has been utilized to ease the plight of the human beings under consideration. Until comparatively recently, one facet of this pattern was lacking—a person trained to consider the chronically ill patient as a whole. This person, trained to synchronize all the benefits of the broader aspects of medical science, is the psychiatrist assisted by his staff.

Evidence for this is furnished by the discharge rate at Allegheny County Institution District Hospitals, Veterans Administration Hospital, and other such institutions. Further, the enlightened administrations of such hospitals, with the cooperation of all other branches of medicine, and a daring notion, furnish the proof for a job well begun. The

kindliness rendered our growing hospital population makes for understanding care rather than strictly professional management of the patient. Many chronically ill and aging persons who can afford payment for service request admission to the County Home for rehabilitation, certainly a tribute to an institution ordinarily shunned.

Innovations in a County Home

From experiences with medical services in an Allegheny County institution some important and interesting innovations have arisen. Except for an emergency, no operating room facilities are available in the present institution, nor will there be in the new one, since the expert surgeon performs more efficiently at his own base of operation with his familiar and well-trained corps of assistants.

The county government pays the consultant his usual fee, as well as the private hospital where the services are rendered. In this way public and private medicine join forces for the betterment of the one most concerned—the patient.

The public institution admits eligible chronically ill and aging patients from the private hospitals making beds rapidly available for acute problems. This illustrates the "two-way street" with the public hospital at one end and the private at the other.

Results of the program at Allegheny County Institution District during the period from June, 1946, to May, 1954, are as follows: 23 per cent of the patients were discharged to their homes or gainful occupation; 45 per cent were improved to the point that they became ambulatory within the institution; 12 per cent improved subjectively, but we have no tangible standard of objectivity to evaluate these; 20 per cent showed no tangible improvement. Dynamic physical medicine was encouraged by an understanding county government without any political overtones, and furthered by a corps of willing and able consultants who are paid for services rendered. Lastly, a devoted staff of professionals and non-professionals have not only defeated institutional apathy and phlegmatism but

have inoculated their charges with courage, effort, and a will to live in dignity.

Conclusions

New institutions must be planned on a broad base to meet ever-changing economic and physical needs of future inhabitants. General private hospitals must meet the situation squarely with administrative and professional personnel imbued with the philosophy that the chronically ill and aged patient cannot be left to vegetate. Benign incarceration of the "backroom chronic" or "oldster" must be eliminated by an enlightened medical profession.

Rehabilitation or physical restoration programs must be simple to fit the public purse, thus aiding the budget-makers to supply more than animal needs. Medical specialties in all categories must be used for needed services over and beyond

institutional personnel capabilities. Existing public resources must be utilized to supplement facilities available at the institutions. There must be closer liaison with family and friends of public institution patients to keep the former apprised of progress so that final disposition may be speeded. Activities, recreational as well as physical, in tolerated, enjoyable "dosages" will provide surcease from morbid monotony and will give a measure of reasonable contentment. Above all, this will make the lot of attending personnel, as well as that of the chronically ill and aging, more pleasant.

Health problems of the chronically ill and aging are responsibilities of the medical profession, and this responsibility can never be delegated until it is assumed. The physiatrist faces a task which will become larger and tax the ingenuity of those who work with and assist him.

SIR MORTON SMART, G.C.V.O., D.S.O., M.D.

Sir Morton Smart, who died at his home at Cooden Beach in England on March 16, 1956, was one of the physiatrists primarily responsible for establishing this specialty in England.

He was born in 1878 and received his medical education at Edinburgh University where he was graduated in 1902, after interrupting his medical career to serve as a volunteer in the Highland Brigade in the South African war. He developed his interest in physical medicine shortly after graduation and moved to London, where he was appointed the first medical officer in charge of the x-ray and electrical departments at the world-renowned Hospital for Sick Children, Great Ormond Street. At the same time he started private practice in physical medicine and developed this subject in two particular respects, firstly the use of manipulation and secondly the employment of faradism, especially in the treatment of muscle injuries. In these two spheres he became pre-eminent and published a book on the latter subject. His work in this field soon brought him international prestige.

In 1914 his professional career was interrupted when he volunteered to serve in the Royal Navy, where Mr. (now Sir) Winston Churchill recommended his commission as a Commander to take part in the development of fast motor boats, in which he always had a very active interest. During a distinguished career in the Navy he was awarded the D.S.O.

On his return to civilian life in 1919 his practice expanded tremendously and he developed a liaison with his American colleagues. In particular a long friendship started with the late Dr. William O'Neill Sherman of Pittsburgh, the orthopedist and medical director of the United States Steel Corporation. Dr. Sherman introduced Sir Morton Smart's methods of treatment at Pittsburgh and they are still employed there to-day.

During World War II Sir Morton remained in civilian practice but gave great service as an honorary civilian consultant in physical medicine to the R.A.F. In his large international practice he was privileged to attend many members of the British Royal Family and was the first physiatrist to hold a royal appointment in England. King George V appointed him a Commander of the Royal Victorian Order in 1932 and a Knight Commander of the same order the following year, this order being awarded for personal services to the Royal Family. He was appointed Manipulative Surgeon to the King on the accession of Edward VIII to the throne and was re-appointed to this post on the accession of George VI. When Queen Elizabeth II ascended the throne he became Extra Manipulative Surgeon to the Queen and held this post until the time of his death. His services to the British Royal Family and other heads of state were recognized by the award of many honors. In 1949, after he had been a member of the medical team treating King George VI for his illness, he was elevated to the Knight Grand Cross of the Royal Victorian Order, and as he himself was ill at that time the King invested him at his bedside, which was a very great honor. He also received a decoration for his services to King Alfonso of Spain in 1931 and was a Chevalier of the Order of St. Charles of Monaco.

Sir Morton had many interests outside medicine and was a most dynamic and cheerful person who gave great encouragement to his staff and patients. He was indefatigable in helping to found the British Association of Physical Medicine, of which he became the first vice-chairman and later an honorary member. He wrote many articles on physical medicine and his passing is a great loss to this specialty. The high public esteem in which he was held was demonstrated by the fact that at his memorial service the lesson was read by Admiral the Earl Mountbatten of Burma and the address given by Marshal of the R.A.F. the Lord Tedder.

In 1923 he married Lilian, daughter of William Gibson, who survives him.

An Evaluation of Some Electrodiagnostic Methods. I.

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Physical Medicine as a service to other medical specialties and to hospitals must include diagnostic procedures as well as treatment facilities. It is well known that roentgenology was closely associated with physical therapy for many years.¹ Certainly roentgenology has assumed a maturity of stature through diagnostic and treatment services all of a physical nature. Other physical equipment that might have fallen into the category of physical medicine includes the electrocardiograph and electroencephalograph. These tools of diagnosis have found their niche in the specialties that most frequently need their particular results. The metabolimeter has been shifted from one service to another until it has generally ended up with laboratory services. While most departments of physical medicine have Wood's filter available, it is generally found in and used by the department of dermatology.

With the advent of the electronic age, the Baruch Committee, in considering educational qualifications for physicians planning to specialize in physical medicine, recommended that a course in instrumentation should be required.² In 1944, such a course was introduced at the Massachusetts Institute of Technology; young men training for physical medicine were selected for a semester's training in the field of instrumentation. Other training centers have now introduced or made available similar training facilities. An adequate department of physical medicine and rehabilitation should furnish certain diagnostic facilities, where they involve the use of physical equipment and have personnel trained in its use and in the clinical interpretations resulting therefrom. The equipment most frequently found in a physical medicine department includes low voltage generators (usually of the sine wave and variable square wave va-

riety), galvanometers with thermocouples, electromyographs with various appurtenances, a variety of stimulators, and resistance equipment. This equipment will give valuable diagnostic information, especially in neuromuscular disorders, and to this end its use, misuse, and limitations will be discussed.

All electrical equipment has certain physical limitations "built in."³⁻⁶ Unexplained physiologic factors and alterations caused by pathology add to these limitations.^{3, 5} It is unwise to extrapolate or interpolate beyond these limitations without sufficient evidence. The misuse of equipment and the results obtained through such experimentation have led to considerable debate and controversy in the literature. This in turn leads to unreliability of the interpretation of findings beyond the limitations of the equipment.⁶ Perhaps it would be wise to err on the side of conservatism than on the side of optimism and conjecture.

Since most of the equipment available for diagnostic purposes affects the nervous system, this discussion will be limited to an evaluation of the electrodiagnosis of peripheral nerve lesions. The wealth of material available for such a discussion is so abundant that the paper will be divided into three sections. Section one will deal with methods and technics that measure changes indirectly concerned with nervous function. Section two (to appear at a later date) will cover the methods that use electrical shocks deliberately produced and applied. Section

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three (also to appear at a later date) will discuss the use of electromyography, primarily with reference to peripheral nerve lesions.

Skin Temperature

Various types of thermometers were used for many years to determine skin temperature. With the advent of the thermocouple and later thermistors, the continuous or intermittent temperatures of the skin could be recorded at one or many places on the body in rapid order. A sensitive, low resistance galvanometer is used to record the potential changes at the junction of the thermocouple. This is usually accomplished by the use of a Wheatstone Bridge arrangement with a reference temperature of ice water or in some cases a standard cell.⁷ Eiermann and Michler⁸ use a six-color Sieman's automatic writing recorder.

In most instances, the equipment for recording consists of a galvanometer scale, light reflected on a scale, and standardization of the scale from arbitrary figures to temperatures or a standardized temperature scale for direct reading.

When a peripheral nerve is interrupted there is a change in the skin temperature.⁹⁻¹⁷ This is generally agreed to be due to circulatory changes. There is first a warm phase caused by the interruption of the vasoconstrictor fibers of the sympathetic nervous system contained within the peripheral nerve that was injured. The cold phase¹⁰ that follows may be the effect of lowered local metabolism, sensitization of the denervated blood vessels to epinephrine, and the loss of the axon reflex. Doupe^{14, 15} doubts the existence of an axon reflex in this regard; while Schulenberg¹⁸ adds to the list of factors: integrity of the innervation to the rest of the limb, changes in the local environmental temperature, and organic changes in the peripheral vessels.

The recording of skin temperature has been used clinically for many practical purposes nearly all of which are in relation to the circulation and its heat production in the skin. Roth and Sheard^{19, 20} used it to determine the effects of smoking and alcohol on periph-

eral circulation. Richards¹¹ has used it repeatedly in his studies on circulation. The studies mentioned are really correlating circulatory changes that follow partial or complete denervation. The method is used as a routine procedure for diagnosis of peripheral vascular disease in some hospitals.

Skin Resistance

Nearly 50 years ago Peterson and Jung²¹ investigated psychophysical reactions with a galvanometer. They found that with emotional changes there were fluctuations in the galvanometer when it was led off from the skin. This was later called the psychogalvanic reflex. Brazier²² studied the result of polarization from galvanic current and measured the skin's resistance to alternating currents. By this method, she attempted to avoid the high counter electromotive force of the skin. She considered normal skin to be a dielectric and as such it had specific physical properties. She developed the impedance angle test, which was supposed to measure the dielectric loss angle regardless and independent of size and shape. This has since been termed the angle of impedance (I. A.) and is a measure of a physical property of human tissues and not of the skin alone.

Richter²³⁻²⁵ applied these principles to the study of skin resistance as a measure of abnormal nerve physiology. He used a dermometer consisting of two 4½ volts dry cells, a potential divider, and a microammeter. One electrode was clipped to the lobe of the ear after a puncture wound was made with a hypodermic needle. The effect of the wound was to reduce the skin resistance under the electrode to practically zero. A second electrode, or exploring electrode, was passed over the skin, and the microammeter recorded the current flow through the skin. Because of the effectiveness of the ear lobe electrode, it was unnecessary to grease the skin or exploring electrode with electrode jelly (although it was used under the ear lobe electrode). This gave a rapid, effective, technically simple method of exploring the skin.

The whole body was explored and areas of high and low normal skin re-

sistance were found. Areas that were rich in sweat glands had lower resistance than areas with fewer sweat glands although it was shown that it was not the sweat *per se* which caused the lower resistance. Warm areas such as the axilla and the antecubital fossa, the palms of the hands, and soles of the feet were also areas of lower skin resistance.

From the normal figures variations due to changes of innervation could be measured. The first studies were those following sympathectomy; areas of high skin resistance were mapped along the denervation routes. These experiments were paralleled with skin sweating tests and plethysmographic tests, which corroborated the effectiveness of skin resistance as an accurate measure of the areas of denervation. The areas of sympathectomy, as outlined by skin resistance, closely followed the areas of the sensory dermatomes. Serial skin resistance tests followed the course of nerve regeneration of the sympathetic fibers or on occasion disclosed the fact that certain fibers had been missed.

By accurately mapping the skin, the investigator could locate some spinal cord lesions. The method has the advantage that the patient does not have to cooperate to obtain satisfactory results. In order to obtain the most satisfactory results, it is necessary to preheat the patient to reduce the skin resistance to the lowest possible amount. This can be done by any of the available methods of heat production in a physical medicine department.

Richter also studied the effect of peripheral nerve lesions on skin resistance. He found that because the sympathetic fibers accompanying the peripheral nerves were also lost, there were delineated areas of high skin resistance that would outline not only motor denervation but also the areas of sensory disturbance. The test could be used to locate the site of the injury as well as the distribution. Recovery could also be followed with a possible correlation of the rate and character of regeneration of the autonomic and sensory nerves.

While there are areas of overlap as a result of diffusion of contiguous fields,

these areas also could be mapped on the skin. The remarkable accuracy of the method could be marked by lines of division of sometimes as little as one-eighth of an inch.

This test is one of the simplest electrodiagnostic methods available and has multiple purposes. As a supplementary or complementary test for peripheral nerve lesions this as well as skin temperature readings are useful in circulation studies as well as muscle-nerve testing. To date it has not been a widely used diagnostic method.

Discussion

The electronic age has presented precision tools to mankind. It would be negligence on the part of modern medicine to pass these tools by without investigating new methods of measuring the physical and biological properties of man.³⁰

In every medical school, the experimental laboratories now possess such equipment, ranging from the electron microscopes to pocket-size radiation counters. Every contributory field is making available to medicine tests and measurements of the internal and external environment of man and animals. Day by day, mysteries of the past are being solved and undreamed of secrets are revealed as common facts of life.

We would be remiss if we did not accept the challenge. Rose and Mead³¹ have made an attempt at measuring the properties of sensation. Elkins³² has used the strain gage in measuring muscle strength. Both of these are efforts in the right direction toward the utilization of available methods in tests and measurements. Many more electronic devices are in the hands of medical research groups.

Yet with all the encouraging medical progress in electronics,³³ one cannot but reflect that doctors are "of the most utter and abysmal ignorance imaginable about devices electronic."³⁶ Even "cookbook" instructions leave him (the doctor) at sea if there is more than one knob to turn. Doctors lack knowledge of gadgets and know less of significant figures (of accuracy and performance). The electronic engineer lacks biologic knowledge

and therefore has difficulty in fabricating instruments for doctors, without accurate specifications. Davis⁶ sets out some things to think further about:

1. "Medical personnel not only seldom have any idea how electrical devices (even one so simple as a fluorescent light) work, seldom care, but often are afraid of them."
2. "A medical man seldom knows enough to describe a special electrical gadget he wants, which makes it difficult to design. Furthermore limitations inherent in such instruments are likely to be completely incomprehensible to the ultimate operator."
3. "The more knobs on the panel the less likely will the user be able to make even the best instrument work."
4. "Portable usually means 15 pounds or less even if weight reduction adds expense."
5. "All electromedical gear must fail safe."
6. "Be careful that a device contemplated for mass production is not one demanded because of a fad whose popularity is waning."
7. "Medical men never agree on everything and seldom agree on anything."

With a healthful philosophy of electronics and the above admonitions in mind, physiatrists should proceed to open new horizons to the better practice of medicine with better, newer, and more accurate tools. Never should we have just the tools for their own sakes or to impress the public.

Perhaps these remarks reflect the reason why many hospitals, in this electronic age, are still standing by Erb's original hypothesis of electrodiagnostic testing. Perhaps the newer devices for electrodiagnostic testing are beyond our ken, or perhaps we neither understand them nor have the technical ability to use them fruitfully. To misuse them would be a greater evil. It would seem that to be of service to physical medicine as well as to the hospital, the simpler tests could be learned and carried out accurately. Skin temperatures and skin resistance can give positive evidence to the clinician that, coupled with the art of physical diag-

nosis, will enable him to proceed in the treatment of the patient.

Summary

Part one of a three-section discussion of some electrodiagnostic methods deals with the measurement of skin temperatures and skin resistance. These methods measure changes indirectly concerned with nervous function. They require a more intimate knowledge of anatomy and developmental anatomy than some other methods but are easily performed with less complicated electrical equipment. Interpretation of the extent of nerve lesions is made by deduction from other physiologic and pathologic information obtained by the testing procedures; however, the validity of these deductions is quite accurate if the associated data is properly evaluated. Sections two and three, other electrodiagnostic methods, will appear at a later date.

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DON'T GET CAUGHT IN THE CROWD!

Register early for the meeting — official registration will be open on Sunday, September 9, from 1:00 to 5:00 p.m. in the Sun Porch Foyer. Tickets for the Instruction Seminar and Congress/Academy dinner will be available.

2nd International Congress of Physical Medicine

IIe Congres international de Medecine Physique

2° Congreso internacional de Medicina Fisica

2. internationalen Kongress für Physikalische Medizin

CHRISTIANSBORG CASTLE

August 20 - 24, 1956 • Copenhagen, Denmark

Scientific Program

MONDAY, August 20, 10:00 a.m.

The Opening Ceremony in the Festival Hall of the University of Copenhagen, Frue Plads, Copenhagen K.

The lighting of the Ceremonial Lamp by the President of the International Federation of Physical Medicine.

Installation of the President of the Congress by the President of the International Federation of Physical Medicine.

Presidential Address: Dr. Sv. Clemmesen.

Speech of Welcome by the Chairman of Dansk Fysiurgisk Selskab, Dr. Ole Sylvest.

Lecture by Dr. Sv. Clemmesen.

MONDAY, August 20, 2:30 p.m.

Subject: **The Heat Regulation and Peripheral and Central Circulation as Basic Problems within Physical Medicine.**

Chairman: Professor Ejnar Jarlov, M.D., Denmark.

TUESDAY, August 21, 10:00 a.m.

Subject: **The Striated Muscle. Clinical and Physiological Problems in Relation to Physical Medicine.**

Chairman: Professor K. M. Walthard, M.D., Switzerland.

WEDNESDAY, August 22, 10:00 a.m.

Subject: **Rehabilitation.**

Chairman: Frank H. Krusen, M.D., U.S.A.

THURSDAY, August 23, 10:00 a.m.

Subject: **Clinical Communications.**

Chairman: L. T. Wedlick, M.D., Australia.

FRIDAY, August 24, 10:30 a.m.

General meeting of the International Federation of Physical Medicine. Report from the Honorary Secretary, Ph. Bauwens, M.D.

Closing ceremony by the President, Sv. Clemmesen, M.D.

Detailed information regarding this meeting may be had from the Office of The Secretary General:
B. STRANDBERG, M.D., KOBENHAVNS AMTS SYGEHUS, HELLERUP, DENMARK.



American Academy

OF PHYSICAL MEDICINE AND REHABILITATION

Preliminary Program

SCIENTIFIC SESSION

MONDAY, September 10 — 10 A.M.

Surf Room

Presiding — JOHN H. KUITERT, Ottawa, Can.
Assisting — JEROME WEISS, Brooklyn.

ADDRESS OF WELCOME

Sam I. Boynton, M.D., President
American Academy of Physical Medicine and Rehabilitation

Symposium: Rheumatic Diseases of the Joints and Non-Articular Structures.

HARVEY N. VANDERGRIFT, M.D. (by invitation),
Atlantic City: Moderator

JAMES SYDNEY STILLMAN, M.D. (by invitation),
Chief, Medical Services, Robert Brett Brigham Hospital, Boston: Clinical Symptomatology of the Various Rheumatic Diseases.

LOUIS P. BRITT, M.D., Director, Physical Medicine and Rehabilitation, Campbell Clinic, Memphis, Tenn.: Anatomical Joint Changes From an Orthopedic Point of View.

H. WORLEY KENDALL, M.D., Medical Director, Institute of Physical Medicine and Rehabilitation, Peoria, Ill.: Therapeutic Aspects With Special Consideration to Physical Medicine and Rehabilitation Activities.

LOUIS B. NEWMAN, M.E., M.D., Associate Professor of Physical Medicine, Northwestern University Medical School; Chief, Physical Medicine and Rehabilitation Service, VA Research Hospital, Chicago: Rheumatic Heart Disease From the Rehabilitation Point of View.

SCIENTIFIC SESSION

MONDAY, September 10 — 2 P.M.

Surf Room

Presiding — ROBERT BOYLE, Wauwatosa, Wis.
Assisting — OTTO EISERT, Brooklyn.

2:00 A Method for the Measurement of Minimal Muscle Force.

WILLIAM BIERMAN, M.D., Assistant Clinical Professor of Physical Medicine and Rehabilitation, Columbia University and Attending in Physical Medicine, Mt. Sinai Hospital, New York City; Attending in Physical Medicine and Rehabilitation, Franklin D. Roosevelt VA Hospital, Montrose, N. Y.

2:20 Vital Capacity as an Index to Respiratory Muscle Function.

CLARENCE W. DAIL, M.D., Associate Professor of Physical Medicine, School of Medicine, College of Medical Evangelists, Los Angeles; Head Physician, Physical Medicine, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif.

2:40 Rehabilitation of the Aphasie Patient — A Survey of Three Years' Experience in a Rehabilitation Setting.

MORTON MARKS, M.D., Institute of Physical Medicine and Rehabilitation, and

MARTHA TAYLOR (by invitation), New York City.

3:00 Rapid Measurement of the Tension of Carbon Dioxide in Blood: A New Tool for the Assessment of Respiratory Status in Artificial Respiration.

RICHARD W. STOW, Ph.D. (by invitation), Assistant Professor, Department of Medicine, Section of Physical Medicine, College of Medicine, Ohio State University, Columbus, Ohio.

3:30 Report of Pre-Convention Meetings of the American Association of Electromyography and Electrodiagnosis.

PAUL A. SHEA, M.D. (by invitation), Director, Department of Physical Medicine, Mercy Hospital; San Diego County General Hospital, and President, American Association of Electromyography and Electrodiagnosis, San Diego, Calif.

OPEN DISCUSSION OF THE PAPERS PRESENTED DURING BOTH SESSIONS
WILL BE MADE FROM THE FLOOR

AMERICAN CONGRESS OF PHYSICAL MEDICINE and REHABILITATION

Thirty-Fourth Annual Scientific and Clinical Session

Preliminary Program

SCHEDULE OF INSTRUCTION SEMINAR

MONDAY, SEPTEMBER 10
Room 125

10:00 a.m. and 1:00 p.m. **A Guide for Medical Writing.**

MONDAY, SEPTEMBER 10
Rooms 121-122

10:00 a.m. and 1:00 p.m. **The Essentials of Lower Extremity Bracing.**

TUESDAY, SEPTEMBER 11
Room 125

8:00 a.m. **Considerations of Pain Control: Physical and Psychological.**

WEDNESDAY, SEPTEMBER 12
Room 125

8:00 a.m. **Considerations of Pain Control: Physical and Psychological.**

CONGRESS/ACADEMY DINNER

The Congress/Academy dinner will be held on Wednesday, September 12, at 7:00 p.m. Dress is optional. Exhibitors and guests are welcome.

THE INSTRUCTION SEMINAR

Physicians as well as physical therapists who are registered with the American Registry of Physical Therapists will be permitted to register for these courses. Members in good standing of the American Occupational Therapy Association are also eligible to enroll for the seminar.

The schedule of the seminar, as arranged, will permit attendance at both the course and scientific sessions.

Each registrant for the course is allowed the choice of one lecture during a period. The charge for the complete schedule of six lectures is \$12.00. Fewer than six lectures may be scheduled at \$2.00 per lecture. The right is reserved to reject any application if the Committee finds it desirable to do so. Registration for specific courses cannot be guaranteed when quotas are filled.

Those who have not completed their registration for the course should do so before attending any of the lectures. No one will be admitted to any of the course lectures without the official registration card for the course. Registration for the course may be completed on Sunday, September 9, starting at 1:00 p.m., at the main registration desk.

GENERAL INFORMATION

RULES GOVERNING THE READING OF PAPERS

No paper or address before the Congress shall occupy more than fifteen minutes in its delivery. The program is so arranged that all time is utilized and it is therefore imperative that the stated time schedule be followed closely. The formal opening discussion of each paper is allowed three minutes for discussion. All other discussions are limited to two minutes.

All papers read before the Congress shall become the property of the Congress for publication in the official journal, **ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION**. Each paper shall be deposited with the assisting officer of the session when read. No publicity shall be released concerning papers scheduled for presentation at the Congress, either before or after presentation, except through the proper officials of the American Congress of Physical Medicine and Rehabilitation.

THE CONVENTION

The registration desk will be open at 1:00 p.m., Sunday, September 9, for registration. Tickets for the Instruction Seminar and Congress/Academy dinner will be available. It is important that everyone register before entering the meeting area. Those not wearing the official badge will be refused admission. This meeting is not open to the public. No registration fee will be charged.

BUSINESS SESSIONS

The annual business meetings of the general membership of the Congress will be held on Tuesday, September 11, 4:00 p.m., and Thursday, September 13, 4:00 p.m.

AMERICAN ACADEMY OF PHYSICAL MEDICINE AND REHABILITATION

The American Academy of Physical Medicine and Rehabilitation will hold its annual scientific session and business meeting on Monday, September 10.

SCIENTIFIC EXHIBITS

Scientific exhibits will be on display and should prove of great interest to all in attendance. As is customary, medals will be awarded to those exhibits which are adjudged outstanding by the Committee on Awards for Scientific Exhibits. The awards will be announced and presented at the Congress/Academy dinner.

TECHNICAL EXHIBITS

The programs of the scientific sessions and instruction seminar have been arranged to allow time for visits and inspection of the technical exhibits. Since these have been given considerable thought and effort, we urge every member and guest to set aside sufficient time for a complete tour of all exhibits.

Exhibits will be open from 8:30 a.m. to 5:00 p.m. on Tuesday, September 11 through Thursday, September 13 until 3:00 p.m.

EDITORIAL BOARD

The annual meeting of the Editorial Board of the **ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION** will be held on Monday, September 10, 6:00 p.m.

SCIENTIFIC FILMS

Scientific films will be shown during the time of the meeting. The complete series of films scheduled will be repeated on Tuesday, September 11, 9:00 a.m., and Thursday, September 13, 1:00 p.m., Rooms 121-122.

VETERANS ADMINISTRATION

Fifth Annual Conference of VA Chief Consultant and VA Area Consultants, Physical Medicine and Rehabilitation Service, Sunday, September 9, Room 118, 10:00 a.m. Co-Chairmen: Donald A. Covalt, M.D., and A.B.C. Knudson, M.D.

Eighth Annual VA meeting for Chiefs, Acting Chiefs, Assistant Chiefs, Staff Physiatrists, Consultants and Attending Physiatrists, Physical Medicine and Rehabilitation Service, Room 125, Wednesday, September 12, 12:00 noon, at luncheon. Tickets may be purchased at desk in registration area.

SCHEDULE OF DAILY ACTIVITIES

34th ANNUAL SESSION

SUNDAY, September 9

- 10:00 Meeting, Veterans Administration Consultants, Room 118
1:00 Registration, Sun Porch Foyer

MONDAY, September 10

- 8:30 Registration, Sun Porch Foyer — Inspection of Exhibits
10:00 Instruction Seminar, Room 125
10:00 Instruction Seminar, Rooms 121-122
10:00 Scientific Session, American Academy of Physical Medicine and Rehabilitation, Surf Room
11:00 Board of Governors, American Academy of Physical Medicine and Rehabilitation, Room 118
12:00 Luncheon
1:00 Instruction Seminar, Room 125
1:00 Instruction Seminar, Room 121
2:00 Scientific Session, American Academy of Physical Medicine and Rehabilitation, Surf Room
4:30 Annual business meeting, American Academy of Physical Medicine and Rehabilitation (members only), Surf Room
6:00 Meeting and Dinner, Editorial Board, Room 110

TUESDAY, September 11

- 8:00 Registration, Sun Porch Foyer — Inspection of Exhibits
8:00 Instruction Seminar, Room 125
9:00 Scientific Session, Renaissance Room
9:00 Scientific Session, Surf Room
9:00 Scientific Films, Rooms 121-122
10:00 Board of Governors, American Congress of Physical Medicine and Rehabilitation, Room 118
12:00 Luncheon — Inspection of Exhibits
12:00 Luncheon, Committee on Advances in Education, American Congress of Physical Medicine and Rehabilitation (by invitation), Room 118
2:00 Formal Opening Session, Renaissance Room
4:00 First Congress business meeting (members only), Renaissance Room

WEDNESDAY, September 12

- 8:00 Registration, Sun Porch Foyer — Inspection of Exhibits
8:00 Instruction Seminar, Room 125
9:00 Scientific Session, Renaissance Room
9:00 Scientific Session, Surf Room
12:00 Luncheon Meeting, VA Group, Room 125 (by invitation)
12:00 Luncheon — Inspection of Exhibits
2:00 Scientific Session, Renaissance Room
7:00 Congress/Academy Dinner, Renaissance Room

THURSDAY, September 13

- 8:00 Registration, Sun Porch Foyer — Inspection of Exhibits
9:00 Scientific Session, Renaissance Room
9:00 Scientific Session, Surf Room
12:00 Luncheon — Inspection of Exhibits

- 1:00 Scientific Session, Renaissance Room
1:00 Scientific Films, Rooms 121-122
4:00 Second Congress business meeting (members only), Renaissance Room

FRIDAY, September 14

- 8:30 Registration, Sun Porch Foyer
9:00 Scientific Session, Surf Room
10:00 Board of Governors, Congress, Room 118

GENERAL SCIENTIFIC SESSION

TUESDAY, September 11 — 9 A.M.

Renaissance Room

Presiding — ROBERT W. BOYLE, Wauwatosa, Wis.

Assisting — LUCILE M. EISING, San Francisco

9:00 The Results of the Application of Ultrasonic Vibration to Experimentally Induced Neuromas in the Dog.

DAVID RUBIN, M.D., Ph.D., Department of Physical Medicine, University of Southern California Medical School; Staff Physician, California Rehabilitation Center, Los Angeles;

GEORGE V. MAGOVERN, M.D. (by invitation), Instructor, Department of Surgery, George Washington University Hospital, Washington, D. C., and ROBERT E. KALLENBERGER, M.D. (by invitation), Laboratory Service, Brooke Army Hospital, Ft. Sam Houston, Texas.

Surgically induced neuromas in the sciatic nerve of two dogs were treated with ultrasound in an effort to determine whether gross and histopathological changes could be detected in such neuromas. The clinical effectiveness of ultrasound in relieving neuroma pain prompted this study. Gross comparison revealed larger proximal neuromas in the control extremity than in the treated extremity in the same animal. Study of sections of proximal and distal neuromas failed to reveal any histological differences between control and treated tissues. There was no evidence of thermal alteration in any of the soft tissues of the treated extremities. The explanation is advanced that relief of neuroma pain in patients treated with ultrasound is probably the result of an altered physiological state of the nerve tissue rather than an anatomical change in nerve structure.

DISCUSSANT: JUSTIN F. LEHMANN, M.D., Columbus, Ohio

9:20 Muscle Shortening Produced by Ultrasound.

JEROME W. GERSTEN, M.D., Associate Professor, Physical Medicine and Rehabilitation, University of Colorado, School of Medicine, Denver.

Frog sartorius, in vitro, was exposed to ultrasound. In some experiments, tension development under isometric conditions was measured, while in others, the amount of shortening was recorded. Significant shortening and increases in tension could be produced by ultrasound, though the magnitude was far smaller than that resulting from electrical stimulation or the addition of adenosine triphosphate. The shortening that followed ultrasound was slow in onset and development and was not sustained indefinitely, for there was a return toward normal even while sounding was continued. The purely mechanical effect of the radiation pressure was ruled out as a factor responsible for the shortening. Ultrasonic shortening was then compared with that produced by infrared radiation, and was found to differ completely. When the membrane was altered, either by glycerol or by cocaine, ultrasound no longer produced any shortening. This was analyzed in terms of previous knowledge of membrane effects of ultrasound, and it was postulated that the shortening was of the nature of a contracture, following some change at the membrane level.

DISCUSSANT: William J. Erdman, II, M.D., Philadelphia.

9:40 Effect of Ultrasonic Energy on Osteogenic Sarcoma: An Experimental Study.

JOSEPH M. JANES, M.D. (by invitation), Section of Orthopedic Surgery, Mayo Clinic and Mayo Foundation;

DAVID C. DAHLIN, M.D. (by invitation), Section of Surgical Pathology, Mayo Clinic and Mayo Foundation;

J. F. HERRICK, Ph.D. (by invitation), Section of Biophysics and Biophysical Research, Mayo Clinic and Mayo Foundation, and

GEORGE M. HIGGINS, Ph.D. (by invitation),
Section of Anatomy, Mayo Clinic and Mayo Founda-
tion, Rochester, Minn.

The destructive effect of ultrasonic energy on bone has been demonstrated repeatedly in our laboratory. Medullary fibrosis associated with cortical necrosis is the most frequent finding. Bones are more susceptible to fracture following exposure to this physical agent. An experimental study of the effect of ultrasonic energy on the epiphyseal region of young dogs and rabbits led to the conclusion that it has a destructive effect on growing bone. Defects created surgically in the femora of dogs were exposed to ultrasonic energy in order to study its effect on the healing of bone. Stimulation of the healing of these defects was not seen. Although osteogenesis was produced by this physical agent, this type of osteogenesis was purposeless and without direction as far as repair of the defects was concerned. A definite delay in healing was observed. The well-established potential destructive force of ultrasonic energy on bone obviously suggests the investigation of using this energy for possible inhibition of the growth of bone tumors as well as possible destruction of the tumors themselves. Fortunately, a method for the production of osteogenic sarcomas in rabbits was available, and these sarcomas afforded an excellent test object for the desired study. Necrosis was produced in them by ultrasonic energy. The particular technic employed for administering this agent did not ensure a field of uniform intensity and consequently islands of viable tumor cells remained. Further work is planned whereby fields of uniform ultrasonic energy may be attained, thus making possible destruction of the entire tumor.

Discussant: Milos J. Lota, M.D., Yonkers, N. Y.

10:00 Horizontal "Leg Press" Exercises.

ROY H. NYQUIST, M.D., Chief, Physical Medicine and Rehabilitation Section, Paraplegia Service, VA Hospital;

CHARLES E. WILLHITE, B.S. (by invitation), Supervisor, Corrective Therapy Clinic, Paraplegia Service, Physical Medicine and Rehabilitation Section, VA Hospital;

RUDOLPH JAHN, B.S. (by invitation), Assistant Chief, Corrective Therapy Section, Physical Medicine and Rehabilitation Section, VA Hospital, and JAMES P. SHERIDAN, B.S. (by invitation), Corrective Therapist, Paraplegia Service, VA Hospital, Long Beach, Calif.

The results of treatment of five patients with incomplete spinal cord injury are described. Progressive resistive exercises for the lower extremities were employed by a new method that combines the resistance of springs with the traveling platform of the McCarthy exercise table.

Discussant: Louis P. Britt, M.D., Memphis, Tenn.

10:20 The Effectiveness of Brief Maximal Exercise on the Strength of the Quadriceps Femoris.

DONALD L. ROSE, M.D., Professor and Chairman, Department of Physical Medicine, University of Kansas School of Medicine, Kansas City, Kans.;

STANLEY F. RADZYMINSKI, M.D., Chief, Physical Medicine and Rehabilitation, VA Center, Wadsworth, Kans., and

RALPH R. BEATTY, M.D. (by invitation), Chief, Physical Medicine and Rehabilitation, VA Hospital, Kansas City, Mo.

This work is an attempt to confirm the studies of Hettinger and Mueller and to extend the procedure of brief maximal exercise into the clinical field. The method employed consisted of determining the maximal weight which the quadriceps femoris could carry through a full range of motion and sustain for 5 seconds, repeating this procedure daily with a single attempt to increase progressively the weight lifted. In 28 normals, an average increase in strength of 0.7 pound per day (to a plateau level) was observed. No significant measurable muscular hypertrophy was observed. In 32 adults with quadriceps weakness, marked variation in exercise response was observed; however, the response of some differed very little from the normal. Ten normal adults attained plateau strength by this method. The strength so attained persisted with exercise frequency as seldom as once monthly. The point at which strength is lost was not determined.

Discussant: Anton A. Tratar, M.D., Oakland, Calif.

10:40 Physical Fitness Studies in Hospitalized Diabetic Patients.

HARRY T. ZANKEL, M.D., Chief, Physical Medicine and Rehabilitation, Crile VA Hospital;

MARK W. ULLMAN, B.S.D. (by invitation), Corrective Therapist, G.M.&S. Supervisor, Crile VA Hospital;

EARL B. RAYMER, M.A. (by invitation), Chief, Corrective Therapy, Crile VA Hospital, and

EMIL CHIORTAN (by invitation), Chief, Manual Arts Therapy Section, Crile VA Hospital, Cleveland.

Diabetic patients were referred to the physical medicine and rehabilitation service for treatment. Routine physical fitness index (Rogers) studies were made of these patients at the beginning and end of treatment. Some patients were referred to the corrective therapy and manual arts therapy sections; others were referred to the manual arts therapy section alone. The object was to determine what effect, if any, an intensive exercise program has upon the physical fitness index of hospitalized diabetics. The results, as shown by improvement in their physical fitness index, indicate that they will benefit by such a program.

Discussant: George M. Piersol, M.D., Philadelphia.

GENERAL SCIENTIFIC SESSION

TUESDAY, September 11 — 9 A.M.

Surf Room

Presiding — ELIZABETH S. AUSTIN, Los Angeles

Assisting — GEORGE C. TWOMBLY, JR., Denver

9:00 Changes in Peripheral Blood Flow Produced by Short Wave Diathermy.

DAVID I. ABRAMSON, M.D. (by invitation), Professor and Head, Department of Physical Medicine and Rehabilitation; Professor of Medicine, University of Illinois, College of Medicine;

ALVIN J. HARRIS, M.D. (by invitation), Research Assistant, Department of Physical Medicine and Rehabilitation, University of Illinois, College of Medicine, and

PETER BEACONSFIELD, M.D., Ph.D. (by invitation), Assistant Professor, Department of Surgery, Chicago Medical School; Associate in Surgery, Cook County Hospital, Chicago.

The effect of short wave diathermy on blood flow in the forearm was studied in human subjects, using the segment type of venous occlusion plethysmograph. At a bath temperature of 32°C. (under which conditions cutaneous vessels are capable of readily dilating or constricting), a significant increase in blood flow was consistently observed during diathermy and for the subsequent 40 to 60 minutes. At a bath temperature of 45°C. (under which conditions cutaneous vessels are maximally dilated), diathermy still elicited a definite increase in forearm blood flow, in many instances, of a greater magnitude than at a bath temperature of 32°C. It was concluded that diathermy augments muscle blood flow. Furthermore, when the limb is heated, the vasodilating effect of this procedure may be enhanced, a hypothesis that has clinical implications.

Discussant: Charles S. Wise, M.D., Washington, D. C.

9:20 Consideration of Laboratory Studies as They May Affect the Treatment of Clinical Atherosclerosis.

JOHN J. HAGLIN, M.D. (by invitation), Research Assistant, Department of Surgery, University of Minnesota Medical School;

THOMAS O. MURPHY, M.D. (by invitation), Instructor, Department of Surgery, University of Minnesota Medical School, and

DAVITT A. FELDER, M.D. (by invitation), Clinical Assistant Professor, Department of Surgery, University of Minnesota Medical School, Minneapolis.

This report is an objective attempt to evaluate the effect of lumbar sympathectomy upon the ischemic extremity, using the electroplethysmographic measure of digital blood flow in a constant temperature environment. The effect of generalized vasodilatation by whole body heat stimulus and that of intravenous tolazoline (Priscoline) was studied. These studies have led to the following conclusions. The use of whole body vasodilatation, either heat-induced or due to chemical means, is contraindicated in the sympathectomized patient, as there is a distinct reduction of digital pulse volume under these circumstances. The use of whole body heat vasodilatation to predict the effect of surgical sympathectomy is valid as to trend but is not a quantitative measure. The probable effect of lumbar sympathectomy in the older age groups and in diabetic terminal arteritis is equivocal, and may be detrimental.

Discussant: Leonard F. Bender, M.D., Ann Arbor, Mich.

9:40 Measurements of Peripheral Blood Flow Under Conditions of Physiologic Stress.

C. J. IMIG, Ph.D. (by invitation), Assistant Professor of Physiology and Orthopedic Surgery, College of Medicine, State University of Iowa;

HAROLD GASKILL, JR., M.S. (by invitation);

ADELIA BAUER, M.D. (by invitation), Research Assistant, Department of Physiology, College of Medicine, State University of Iowa, and

HARRY M. HINES, Ph.D., Professor and Head, Department of Physiology, College of Medicine, State University of Iowa, Iowa City.

These studies were concerned with the effect of muscular activity on blood flow through the extremities of normal persons and patients with peripheral vascular disorders. Volume blood flow was measured by venous occlusion plethysmography before and for some time after measured amounts of exercise. The resting blood flow in patients with severe peripheral vascular disease was similar to that measured in normal subjects; however, after exercise, the blood flow through the extremities of these patients was severely deficient when compared with the normal hyperemic response. These findings suggest that the blood flow response to stress might be a better measurement than rest blood flow determinations for evaluating the status of the peripheral vascular bed.

DISCUSSANT: Karl Harpuder, M.D., New York City.

10:00 Emotional Aspects of Chronic Physical Disability.

EDWARD M. LITIN, M.D. (by invitation), Consultant, Section of Psychiatry, Mayo Clinic, Rochester, Minn.

Few untoward emotional reactions are witnessed in patients during the acute phases of physical disabilities. When the immediate dangers are over and the early chronic phase is entered the emotional difficulties become apparent. They become so entwined with the physical disabilities that progress or regression in one sphere is reflected in the other. Each patient has his own psychologic vulnerabilities, which become manifest in the early chronic phase when a massive evaluation and reorganization must take place. During this period previous personality patterns become all important and to a large extent determine the degree of future emotional and physical rehabilitation. Some suggestions regarding the development and management of these psychiatric complications are presented.

DISCUSSANT: Leonard D. Policoff, M.D., Albany, N. Y.

10:20 The Psychiatrist and Rehabilitation.

JOHN C. NEMIAH, M.D. (by invitation), Assistant Psychiatrist, Massachusetts General Hospital; Clinical Associate in Psychiatry, Bay State Medical Rehabilitation Clinic, Boston.

An important recent development in rehabilitation is the growing awareness of the importance of emotional problems in patients and the beginning of collaboration between psychiatrist and physiatrist in studying them. Two major sources of emotional conflict are the way in which injury or illness threatens the integrity of the patient's body and the security of his relationships with others. Depending on how the patient handles these problems, a variety of reaction types may be seen clinically. Case histories are cited to illustrate these types, and treatment suggestions are made. The danger of permitting psychological reactions to become chronic and the factors conspiring to make them chronic are discussed. Since the longer a psychological reaction persists the more it tends to become irreversible, the importance of preventive measures early in rehabilitation is emphasized.

DISCUSSANT: Arthur L. Watkins, M.D., Boston.

David B. Allman, M.D., F.A.C.S., F.I.C.S.

Senior Consulting Surgical Chief

Atlantic City Hospital

President-Elect

American Medical Association

2:15 Presidential Address: Expanding Our Educational Goals.

GORDON M. MARTIN, M.D., Consultant in Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minn.

2:45 Rehabilitation of the Upper Extremity Amputees.

HENRY KESSLER, M.D. (by invitation), Director, Kessler Institute for Rehabilitation, West Orange, N. J.

3:15 A Study of Cardiac Output During Rehabilitation Activities.

FREDERIC J. KOTKE, M.D., Ph.D., Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, and

JEAN N. DANZ, B.S., O.T.R. (by invitation), Senior Occupational Therapist, Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, Minneapolis.

The cardiac demands of bed activities and light activities in occupational therapy were studied on normal subjects. The effect on cardiac output of semireclining at a 45 degree angle, sitting on the side of the bed, or sitting in a chair was found to vary only slightly from recumbency. Getting into and out of a bed increased cardiac output by 40 per cent. Chip carving while sitting on a straight chair increased cardiac output 15 per cent. Leather tooling while sitting in bed at a 45 degree angle increased cardiac output 24 per cent. Weaving on a floor loom while sitting on a chair increased cardiac output 77 per cent. Printing with a platen press while standing increased cardiac output 60 per cent. Body position and anti-gravity work are important components in determining the amount of work that the heart must do. The changes in metabolic work during activity may not correspond quantitatively with the changes of cardiac output.

DISCUSSANT: Louis B. Newman, M.D., Chicago.

3:35 Overwork.

G. CLINTON KNOWLTON, Ph. D. (by invitation), Department of Physical Medicine, Georgia Warm Springs Foundation, and

ROBERT L. BENNETT, M.D., Department of Physical Medicine; Medical Director, Georgia Warm Springs Foundation, Warm Springs, Ga.

Overwork, as used in this paper, means a long-lasting reduction of muscle strength resulting from previous activity. Clinical and experimental experiences are cited which indicate that psychologic and even physiologic fatigue can be unreliable indicators for limitation of exercise. Ordinarily, the point of psychologic fatigue is reached before physiologic fatigue occurs and physiologic fatigue does not necessarily represent overwork; however, in certain individuals overwork levels can be reached before either psychologic or physiologic fatigue is encountered. The relation of this to therapeutic exercise and education for self-discipline is discussed.

DISCUSSANT: Robert C. Darling, M.D., New York City.

GENERAL SCIENTIFIC SESSION

WEDNESDAY, September 12 — 9 A.M.

Renaissance Room

Presiding — OSCAR O. SELKE, JR., Houston

Assisting — JOSEPH L. KOZUR, Evergreen Park, Ill.

9:00 Contractures: A Review of the Literature with a Presentation of Unresolved Problems.

MILTON LOWENTHAL, M.D., Associate Professor, Physical Medicine and Rehabilitation, New York Medical College; Attending Physician, Bird S. Coler Hospital, and

JEROME S. TOBIS, M.D., Professor and Director, Department of Physical Medicine and Rehabilitation, New York Medical College, Flower and Fifth Ave. Hospitals; Director, Department of Physical Medicine and Rehabilitation, Bird S. Coler Hospital, New York City.

The development of contractures is an ever-present danger in lesions of the upper and lower motor neurons. A review of the

GENERAL SCIENTIFIC SESSION

TUESDAY, September 11 — 2 P.M.

Renaissance Room

Presiding — GORDON M. MARTIN, Rochester, Minn.
Assisting — FRANCES BAKER, San Mateo, Calif.

OPENING OF THE THIRTY-FOURTH ANNUAL SESSION

INVOCATION

The Reverend Doctor George W. Lawrence
Ventnor City Community Church

ADDRESSES OF WELCOME

The Honorable Joseph Altman
Mayor of the City of Atlantic City

literature of the past 60 to 70 years indicates a significant variation in opinion as to etiology, prophylaxis, and treatment of contractures. Special attention is given to the role of muscle proprioception in the development of contractures and also to the influence of personality factors.

Discussant: Earl F. Hoerner, M.D., West Orange, N. J.

9:20 The Effectiveness of Home-Treatment Instruction in Arthritis.

L. BURTON PARKER, M.D. (by invitation), Fellow, National Foundation for Infantile Paralysis, University of Michigan Medical School, and

LEONARD F. BENDER, M.D., Assistant Professor of Physical Medicine and Rehabilitation, University of Michigan Medical School, Ann Arbor, Mich.

In order to evaluate the effectiveness of instruction in home-treatment programs a survey was conducted among 56 patients with rheumatoid arthritis and osteoarthritis who had previously been instructed in adequate home-treatment programs. At the time of the interview 5 patients had stopped their home-treatment because of improvement in their condition, 27 were still continuing adequate home-treatment programs, and 24 were not treating themselves adequately. Six of these 24 patients never started on their recommended home program; 8 stopped home-treatment between two and four months after their instruction. This was greater than the number stopping in any other comparable period of time; therefore, it appears that the home-treatment program for arthritis should be reviewed with the patient at least every two months.

Discussant: Dominic A. Donio, M.D., Allentown, Pa.

9:40 The Role of Physical Medicine in the Treatment of Functional Dysphonia.

PAUL A. NELSON, M.D., Medical Director, Course in Physical Therapy, Frank E. Bunts Educational Institute, Head, Department of Physical Medicine and Rehabilitation, Cleveland Clinic, and

WARREN H. GARDNER, Ph.D. (by invitation), Lecturer, Audiology and Speech Pathology, Frank E. Bunts Educational Institute and Cleveland Clinic, Cleveland.

Functional dysphonia, a disturbance in the mechanism of voice production, is not related to primary organic disease. Various factors may cause or aggravate this condition: strain due to overuse, malfunctioning of vocal cords, poor quality of voice, faulty breathing habits, and excessive nervous tension. Common presenting symptoms are hoarseness, loss of voice, dryness or burning in the throat, vague pains in the neck or upper chest, shortness of breath, fatigability, and nervousness. When there is no evidence of primary organic disease, the diagnosis of functional dysphonia is established. Treatment is also discussed.

Discussant: Daniel Dancik, M.D., Huntington, N. Y.

10:00 Clinical Evaluation of Speech Deficiencies in the Cerebral Palsied Child.

EDWARD J. LORENZE, III, M.D., Medical Director, The Burke Foundation, White Plains, N. Y.; Associate Professor of Clinical Medicine, Cornell University, College of Medicine, New York City, and

MARTIN A. SOKOLOFF, M.A. (by invitation), Director of Speech and Hearing Services and Coordinator of Cerebral Palsy Clinic, The Burke Foundation, White Plains, N. Y.

An important aspect of the psychiatrist's evaluation of the cerebral palsied child is the definitive enumeration of the speech and language deficiencies present. To assist the physician in determining what deficiencies may be present, the prognosis for improvement, and kinds of treatment involved, the authors have reviewed 181 cases of cerebral palsied children. Included in the study are descriptions of the kinds of speech difficulties encountered, statistical breakdowns as to the incidence of each type of difficulty, and the amount of progress that may be expected with each diagnostic classification. Individual case studies are presented to illustrate techniques of diagnosis and the procedures of therapy recommended for each classification.

Discussant: O. Leonard Huddleston, M.D., Santa Monica, Calif.

10:20 Physical Therapy for Neuropsychiatric Patients—A Suggested Guide.

RICHARD V. FREEMAN, M.D., Chief, Physical Medicine, Neuropsychiatric Hospital, VA Center, and

LOUIS GAST, M.A. (by invitation), Chief Physical Therapist, Neuropsychiatric Hospital, VA Center, Los Angeles.

Physical therapy for hospitalized neuropsychiatric patients requires a correctly prescribed therapeutic attitude as well as correctly prescribed treatment. In our hospital, ward doctors are requested to indicate both treatment modality and attitude in their prescriptions. To assist the doctor in prescribing, available physical therapy is listed under 14 headings based upon the patient's psychological needs. A booklet is provided, discussing the recommended techniques and attitudes to be used for these various needs. Since the treatment of any neuropsychiatric patient is extremely complex, this scheme simply suggests an approach toward thinking about the patient—the essential treatment for the correct attitude must depend on the experience and skill of the therapist. Humanistic empathetic approaches by the therapist are emphasized. Case histories are included.

Discussant: Jack Meilin, M.D., Montrose, N. Y.

10:40 Extended Relief of Tic Douloureux by Physical Therapeutic Measures.

HARVEY E. BILLIG, JR., M.D., Professor of Physical Rehabilitation, Pepperdine College; Staff, Hollywood Presbyterian Hospital, Los Angeles.

The viscerosomatic concepts of neuronal mechanisms underlying the development of cephalic neuralgias, tic douloureux in particular, are reviewed critically. The relations of these neuralgias to each other and to post-constriction, by traumatic fibrous tissue, of the cervical sympathetic is reviewed. Evidence of the contractility and stretching mechanism of fibrous connective tissue is analyzed. Factors influencing the shortening of cervical fibrous tissue and its relation to cephalic neuralgias are discussed. The diagnoses, therapy, course, and prognoses in 1250 cephalic neuralgias, including 27 of sufficient criteria to be termed tic douloureux, treated by cervical fibrous tissue loosening, mobilization, and active and passive assisted stretchings are critically analyzed.

Discussant: Arthur A. Rodriguez, M.D., Chicago.

11:00 The Diagnostic Advantages of Electromyography in Neck and Shoulder Disorders.

CHARLES A. FUREY, M.D., Department of Physical Medicine, Jefferson Medical College, Philadelphia.

Electromyographical findings, when correlated with the clinical picture, offer assistance in diagnosis. This electrodiagnostic procedure assists the physician to readily differentiate the more frequently occurring shoulder lesions from the less common shoulder complaints that are associated with involvement of the brachial plexus, axillary nerve, or cervical nerve roots. Among the other neck and shoulder conditions in which the electromyogram has proved of particular benefit are cervical discs, cervical spondylosis, whip cord injuries, apophysitis, scalenus anticus syndrome, nerve compression phenomena, and the like. In certain of these disorders, the diagnosis cannot be definitely established by the routine procedures, including x-rays; however, the electromyogram will definitely locate the site and amount of nerve damage and aid in determining an accurate prognosis. The electromyogram is to the neuromuscular system what x-ray is to the osseous system.

Discussant: Gregory Bard, M.D., Daly City, Calif.

GENERAL SCIENTIFIC SESSION

WEDNESDAY, September 12—9 A.M.

Surf Room

Panel Discussion: The Chronically Ill and Aging—Whose Responsibility?

MURRAY B. FERDERBER, M.D., Pittsburgh: Moderator

ALFRED KRAFT, M.D. (by invitation), Assistant Director, Allegheny County Institution District, Pittsburgh;

S. DAVID POMRINSE, M.D. (by invitation), Chief, Hygiene of the Aging, Division of Special Health Service, U. S. Public Health Service, Washington, D. C.;

HANK VISCARDI (by invitation), Executive Director, Abilities, Inc., Hempstead, L. I., New York, and

LEO PRICE, M.D. (by invitation), Director, Union Health Center, I.L.G.W.U., New York City.

GENERAL SCIENTIFIC SESSION

WEDNESDAY, September 12 — 2 P.M.

Renaissance Room

Presiding — BEN L. BOYNTON, Chicago
 Assisting — FRED B. MOOR, Los Angeles

2:00 Sixth John Stanley Coulter Memorial Lecture: Some Problems of Communication in Medicine, as Illustrated by the Coulter Bibliography.

FREDERIC T. JUNG, M.D., Ph.D., Assistant Secretary and Director of Physical Laboratory, Council on Medical Physics, American Medical Association; Lecturer in Physical Medicine, Northwestern University Medical School, Chicago.

2:30 Rehabilitation's Hidden Dimension.

WILLIS C. GORTHY (by invitation), Director, Institute for the Crippled and Disabled, New York City.

With the development of more rehabilitation centers, need is increasing for management that will result in proper regard for the value of the professional person's time and effort, at the lowest possible cost. As services of the rehabilitation center become more comprehensive, management becomes much more complex and demands a unified and organized effort. Each profession in the center should employ the most modern techniques, but the over-all management is a function that requires the application of executive skills. Key professional staff members participate in management through the development of policies that will govern the center's activities. Furthermore, when the over-all policies are adopted, with whatever limits are imposed, they have the added task of supervising their professional activities in accordance with these policies. This concept of center management has been developing at the Institute for the Crippled and Disabled and has aroused considerable interest. Specific principles and the results obtained are developed in detail.

DISCUSSANT: Nila Kirkpatrick Covalt, M.D., Winter Park, Fla.

2:50 Concepts of Rehabilitation Centers Change in Practice.

WILLIAM H. REDKEY, M.A. (by invitation), Chief, Rehabilitation Facilities Branch, Office of Vocational Rehabilitation, Department of Health, Education and Welfare, Washington, D. C.

The term rehabilitation center should be reserved for comprehensive facilities. A physical medicine department, sheltered workshop, or vocational training school is not a comprehensive center. Small out-patient treatment centers and hospitals often have difficulty planning for comprehensive centers. Adequate medical supervision and prevocational services are the most common difficulties. The breadth of meaning of the term rehabilitation is not clearly understood by many specialists involved in it. There is some inclination to divide into two main types of centers: the medical center and the vocational center. This trend could make integration of services to the patient much more difficult. Cross consultation between hospital and center and vocational agencies of various kinds will contribute enormously to good service to the rehabilitation patient. Continued change in rehabilitation center concepts is predicted.

DISCUSSANT: Allen S. Russek, M.D., New York City.

3:10 Pre-Vocational Evaluation Criteria for the Severely Handicapped.

WILLIAM M. USDANE, Ph.D. (by invitation), Institute for the Crippled and Disabled, New York City.

Prevocational evaluation criteria for the severely handicapped should be concerned with standards demanded for employment in competitive jobs. These jobs should be represented by work samples that test individual skill and endurance. Capacity for supervisory roles, ability to get along with fellow workers, work tolerance, attendance initiative, and other specific items can be assessed within the prevocational unit in the rehabilitation center or hospital. Norms for the work samples may be established with the help of an advisory committee that includes individuals thoroughly familiar with the nature of the job. The very nature of the limitations of the severely handicapped individual negates, however, the development of rigid criteria; there must still be an understanding of the total individual.

DISCUSSANT: Glenn Gallickson, Jr., M.D., Minneapolis.

3:30 Kansas City Rehabilitation Survey and Demonstration: A Research Study Conducted by Community Studies, Inc.

EDWARD B. SHIRES, M.D., Assistant Professor of Physical Medicine and Rehabilitation, University of Kansas Medical School; Assistant Director, Department of Physical Medicine and Rehabilitation, University of Kansas Medical Center, Kansas City, Kans.

The cost and benefits of a comprehensive program for a metropolitan area are being measured by marshalling into action the community's rehabilitation potential through the coordination of medical and paramedical facilities, as well as the health, social, and vocational services, and industry and business. The methods employed by this research study in the evaluation of patients by the various professional and semiprofessional specialties are described. In addition, the organization of the team approach by the four major categories of the rehabilitation process (medical, psychological, social, vocational) will be followed throughout the rehabilitation program.

DISCUSSANT: Edith L. Kristeller, M.D., New York City.

3:50 Physiatry and the Vocational Rehabilitation Program.

JACK SOKOLOV, M.D. (by invitation), Medical Consultant, Office of Vocational Rehabilitation, U. S. Public Health Service, Department of Health, Education and Welfare, Washington, D. C.

Two important steps in the growth of physical medicine and rehabilitation are the programs developed during and after World War II and the amendments to the Vocational Rehabilitation Act in 1954. The resulting expanded program extends broad medical services to eligible persons in financial need. The new three part grant system administered by the Office of Vocational Rehabilitation is discussed and the expansion of services and extension and improvement of sheltered workshops and rehabilitation facilities are reviewed. Further, a training and teaching grant program was undertaken, which will greatly increase the number of physiatrists and stimulate awareness of the possibilities of the field on the part of other physicians.

DISCUSSANT: Arthur C. Jones, M.D., Portland, Ore.

4:15 Pre-Vocational Medical Evaluation of Young Adult Cerebral Palsied.

SHYH-JONG YUE, M.D. (by invitation), Training Fellow in Rehabilitation, Medical Service, Institute for the Crippled and Disabled; Fellow, Columbia-Presbyterian Medical Center, New York City.

This paper presents a prevocational evaluation of a group of young adults suffering from cerebral palsy. The evaluation was divided into two phases. The physical phase included evaluation of the ability of the patient in ambulation, self-care, and manual dexterity. The mental phase included psychometric studies and speech and psychiatric examinations. A system is proposed to classify each patient in one of five grades in physical performance and, similarly, according to psychological assets. This scheme of classification will later be correlated with their performances in vocational evaluation.

DISCUSSANT: Lucile M. Essing, M.D., San Francisco.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 13 — 9 A.M.

Renaissance Room

Presiding — SIDNEY LICHT, New Haven, Conn.
 Assisting — ARTHUR A. RODRIQUEZ, Chicago

9:00 Physical Medicine in Australia.

LEIGH T. WEDLICK, M.B., M.R.C.P. (London) (by invitation), Physical Medicine Specialist to The Royal Melbourne Hospital, and The Repatriation Department, Melbourne, Victoria, Australia.

9:20 The Rehabilitation Program in Pennsylvania: The Pennsylvania Rehabilitation Center.

HONORABLE JOHN R. TORQUATO (by invitation), Secretary, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

Before Public Law 113 was enacted by Congress in 1943, rehabilitation service in Pennsylvania was inadequate. A record number of disabled were prepared for and placed in gainful employment during the calendar year 1955. Another all-time high of disabled individuals was referred to the Pennsylvania Bureau of Rehabilitation during the year and services have started for virtually all of them. Plans are under way now to at least double the staff in the Bureau of Rehabilitation so services can be provided to all disabled individuals within a minimum lapse of time, and a modern rehabilitation center is under construction.

Discussant: Nicholas Martello, M.D., Wilkes-Barre, Pa.

9:40 Educational Therapy in Hospital Treatment.

C. DEWITT DAWSON, M.D., Chief, Physical Medicine and Rehabilitation Service, VA Center, Jackson, Miss.

Introduction—the patient, focus of all thinking; education; hospitalization; essential additional purpose (education); report on survey of educational therapy as utilized by 200 hospitals with special relation to several questions; transfer of educational therapy to practical and essential areas of life following hospitalization; summary and conclusion.

Discussant: A. B. C. Knudson, M.D., Washington, D. C.

10:00 Some Manifestations of Conversion Hysteria in Rehabilitation.

HERRERT FENSTERHEIM, M.A. (by invitation), Associate Director, Psychological Laboratory, Inc., New York City, and

JOSEPH B. LAKRITZ, M.A. (by invitation), Physical Medicine and Rehabilitation Service, Goldwater Memorial Hospital, Welfare Island, N. Y.

In conversion hysteria, the impulse causing anxiety is expressed in terms of physical phenomena in organs or parts of the body, usually those that are under voluntary control. The symptoms occur in such forms as paralyses and contractures and serve to lessen conscious anxiety. Often they are symbolic of the underlying mental conflict. Two such cases are presented. Another type of conversion symptom occurs in patients with hysterical personalities; although their disabilities are definitely organic in origin, they react to these organic changes in a manner that suggests they are deriving the same secondary gain as in conversion hysteria—the amelioration of conscious anxiety. Three such cases are presented.

Discussant: To be announced.

10:20 The Use of Physical Therapy Modalities Other Than Manipulation in the Treatment of Back Pain.

JOHN McM. MENNELL, M.B., D.M.R.E., Washington, D. C.

A wide choice of physical therapy modalities may be used in the treatment of back pain, but the choice of modality is often empirical rather than reasoned. A prerequisite to successful treatment is accurate diagnosis. "Pain in the back," "back-ache," "back strain," and such terms bear no relationship to accurate diagnosis. In this paper an attempt is made to differentiate pathological conditions, other than joint dysfunction, that may cause back pain and which are amenable to physical therapy. Physical modalities that have proved successful in the author's experience are discussed.

Discussant: Herman J. Bearzy, M.D., Dayton, Ohio.

10:40 The Treatment of Peripheral Vascular Disorders by Means of Synchronic Pressure Impulses.

JAMES F. LYONS, M.D. (by invitation), Jackson Memorial Hospital, Miami; Doctors Hospital, Coral Gables, and

BURTON MEADOWS, M.D. (by invitation), Jackson Memorial Hospital, Miami; Doctors Hospital, Coral Gables, Fla.

The Synchronon applies external pressure to an extremity for an exact, measured time and in perfect synchronization with each pulsation from the heart, thus boosting the arterial pulse wave and forcing more blood through any small vessels that are still patent or capable of dilatation. Through this rhythmic blood flow, it appears possible to increase gradually the size and capacity of these vessels. The key point is in the timing. If improperly timed, the application of external pressure may actually impede the peripheral flow of blood. Of 20 patients who appeared to require amputative surgery at the time treatments were begun only 3 ultimately required amputations, thus further investigation of this new device should be made.

Discussant: Khalil G. Wakis, M.D. (by invitation), Rochester, Minn.

11:00 Remedial Measures for Disabilities Following Thoracic Surgery.

ALBERT HAAS, M.D. (by invitation), Department of Physical Medicine and Rehabilitation, New York University College of Medicine;

HOWARD A. RUSK, M.D., Professor and Chairman, Department of Physical Medicine and Rehabilitation, New York University College of Medicine;

DOGAN AKAN, M.D. (by invitation), Assistant Resident, Institute of Physical Medicine and Rehabilitation, NYU-Bellevue Medical Center, and

ROBERT OSHINS, B.A., R.P.T. (by invitation), Physical Therapist, Bellevue Hospital, New York City.

Rehabilitation is an indispensable phase in correcting the traumatic sequelae that follow surgery. In order to collapse or remove a part of the lung, the surgeon is obliged to mutilate the musculoskeletal structure. Although this kind of surgery has changed to the more favorable plombage thoracoplasty where the ribs remain in situ, important muscles are still severed, stretched, or forced into an unnatural position. To correct the resultant disability, the physiatrist should consider the functional complexity and interrelationships of all the affected muscles. Post-operative sequelae can be remedied if immediate physical therapy is applied.

Discussant: Carl C. Hoffman, M.D., Denver.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 13—9 A.M.

Surf Room

Panel Discussion: Ethical Practices

EDWARD M. KRUSEN, JR., M.D., Dallas, Texas: Moderator

F. MANLEY BRIST, LL.B. (by invitation), Minneapolis; W. EDWARD CHAMBERLAIN, M.D. (by invitation), Philadelphia;

GLENN GULLICKSON, JR., M.D., Minneapolis;

DONALD A. NICKERSON, M.D. (by invitation), Salem, Mass.;

HERMAN L. RUDOLPH, M.D., Reading, Pa., and

OSCAR O. SELKE, JR., M.D., Houston.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 13—1 P.M.

Renaissance Room

Presiding—FLORENCE I. MAHONEY, Baltimore

Assisting—JOHN H. KUITERT, Ottawa, Can.

1:00 The Prognosis for Respiratory Recovery in Severe Poliomyelitis.

JOHN E. AFFELDT, M.D. (by invitation), Assistant Professor, Internal Medicine, School of Medicine, College of Medical Evangelists, Los Angeles; Chief Physician, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif.;

ALBERT G. BOWER, M.D. (by invitation), Clinical Professor, Internal Medicine, College of Medical Evangelists and University of Southern California, Los Angeles; Chief Physician, Communicable Disease Hospital, Los Angeles County General Hospital, Los Angeles;

CLARENCE W. DAIL, M.D., Associate Professor of Physical Medicine, School of Medicine, College of Medical Evangelists, Los Angeles; Head Physician, Physical Medicine, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif., and

NOBBY N. ARATA, M.D. (by invitation), Clinical Instructor in Pediatrics, School of Medicine, College of Medical Evangelists, Los Angeles; Research Associate, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif.

In order to determine the chances of survival of a patient with acute poliomyelitis and his chances of becoming free of the respirator, an analysis of 500 such patients has been made, with a 2-year minimum follow-up. Death occurred in 15 per cent, 73 per cent became free of all respiratory equipment, and 12 per cent required some form of respiratory equipment either full or part time. The peak incidence for removal from respiratory equipment occurred during the second and third months after onset. By the first six months, 83 per cent of those to become free had done so. Vital capacity determinations are correlated with the patient's course. The average vital capacity as per cent of predicted normal at the time of becoming free of respiratory equipment was 62 per cent with a range from 23 to 100 per cent. Of the patients who continued to need a respirator, the average vital capacity was 16 per cent with a range from 1 to 39 per cent. Forty-one per cent of the 2-year respirator group used their equipment at night only.

DISCUSSANT: Herbert Kent, M.D., Oklahoma City.

1:20 The Effect of Body Position in Respiratory Muscle Weakness.

CLARENCE W. DAIL, M.D., Associate Professor of Physical Medicine, School of Medicine, College of Medical Evangelists, Los Angeles; Head Physician, Physical Medicine, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif., and

JOHN E. AFFELDT, M.D. (by invitation), Assistant Professor, Internal Medicine, School of Medicine, College of Medical Evangelists, Los Angeles; Chief Physician, Respiratory Center for Poliomyelitis, Rancho Los Amigos Hospital, Hondo, Calif.

When a patient with respiratory muscle weakness is placed in an erect position, breathing may be facilitated or impaired. Such effects are important since successful rehabilitation usually requires the patient to be erect. When there is moderate diaphragm weakness associated with abdominal muscle paralysis, breathing in a supine position may be easy, but the erect body position causes the diaphragm to descend and thus become shortened and ineffective. In diaphragm paralysis associated with strong abdominal muscles, breathing is difficult when the patient is supine but becomes easy in the erect position, permitting quite heavy activities. The diaphragm drops passively during inspiration and is elevated by abdominal contraction during expiration. It is the aim of this paper to present a practical understanding of the underlying principles as this will facilitate the therapy of such conditions.

DISCUSSANT: Alma J. Murphy, Ph.D. (by invitation), Ann Arbor, Mich.

1:40 Respiratory Rehabilitation in Poliomyelitis.

LEON LEWIS, M.D. (by invitation), Lecturer in Medicine, Stanford University School of Medicine, Stanford; Chief, Poliomyelitis Service, Alameda County Institutions, Alameda County, Calif.;

GERALD G. HIRSCHBERG, M.D., Lecturer in Medicine (Physical Medicine), Stanford University School of Medicine, Stanford; Chief, Department of Physical Medicine and Rehabilitation, Alameda County Institutions, Alameda County, Calif., and

J. PATRICK ADAMSON, M.D. (by invitation), Physician in Charge, Poliomyelitis Respiratory and Rehabilitation Center, Fairmont Hospital, San Leandro, Calif.

The result and rate of rehabilitation are greatly influenced by initial care in the treatment of respiratory paralysis. Prevention of hypoxia and coordinated medical and nursing care influence prognosis for survival and determine the rehabilitation potential. Accessories to the respirator help assure maximum preservation of function and diminish the frequency of complications. Careful management of the urinary tract, bowel, diet, fluid intake, and electrolyte balance are necessities of early care. Regulation of pulmonary ventilation avoids the dangers of hyperventilation alkalosis and in its sequelae. Skillful early care prepares the patient for an active rehabilitation program and eliminates long periods of mental depression with accompanying impairment of motivation. Withdrawal of respiratory aids is gauged according to rate of recovery of function. Acceptance of permanent needs for modified respiratory assistance requires careful psychological orientation of the patient. Determination of specific muscular disturbances and respiratory patterns makes it possible to specify types of abdominal and trunk supports, if needed, and provides a basis for assessing the needs for ventilation assistance in various body positions. Exercise activities must be correlated with respiratory capacity. The general rehabilitation program includes all the modalities of physical and occupational therapy together with the development of assistive devices that may range from simple feeding aids to complex electronic apparatus.

DISCUSSANT: Nadene Coyne, M.D., Cleveland.

2:00 Quantitative Estimation of Postpoliomyelitis Paresis.

WILLIS C. BEASLEY, Ph.D. (by invitation), Consulting Staff, Department of Physical Medicine, Children's Hospital, Washington, D. C.

Evaluation of the magnitude of paresis resulting from poliomyelitis is based essentially on the rules of manual muscle testing. Validity of the ratings depends upon the demonstration that the classifications employed result in differentiating the degrees of paresis in accordance with the percentage ratios as assigned in relation to the definitions of each manual grade class. In the present investigation, three sets of data are compared to evaluate the degree of error in the manual grade classifications: measurements of muscular forces in normals and in poliomyelitis patients with a wide range of residual paresis and manual grade ratings by experienced physical therapists for the same poliomyelitis patients. Some important conclusions are that the degree of error in the manual grading system varies widely for different muscular actions, that generally postpoliomyelitis patients show a continuum in degrees of paresis, which casts doubt on the validity of the concept of paralytic and non-paralytic forms of the disease, and that significant degrees of paresis are shown by large groups of "normal" subjects for all muscular actions listed in the standard charts.

DISCUSSANT: Miland E. Knapp, M.D., Minneapolis.

2:20 Capillary Resistance in Poliomyelitis With and Without Stress of Certain Physical Modalities.

HAROLD N. NEU, M.D., Professor of Medicine, Creighton University School of Medicine; Medical Director, Rehabilitation Center, Creighton Memorial St. Joseph's Hospital;

MARGUERITE KRAMAR, M.D. (by invitation), Research Assistant, Rehabilitation Center, Creighton Memorial St. Joseph's Hospital, and

WARD ANTHONY, M.D. (by invitation), Creighton Memorial St. Joseph's Hospital, Omaha.

Capillary resistance, as measured by the negative pressure method, is of much wider significance than it was thought hitherto. It has been determined, in normal subjects, that capillary resistance is subject to hormonal influence and is an individual trait. Physical or psychic stress may cause this individual level to change temporarily. This change, termed capillary stress response, may set in promptly and last for a few hours or may occur later and last for several days. Capillary stress response reveals typical patterns such as increase, decrease, or biphasic reaction. Capillary resistance was also investigated in poliomyelitis patients. The following questions were analyzed: Does the pathologic condition of such patients influence individual capillary resistance level? Does it modify capillary stress response? Can any effect of the intensive rehabilitation program be shown on the capillary resistance? The effect of certain physical therapy procedures on the capillary resistance were also compared in these patients.

DISCUSSANT: Wm. Benham Snow, M.D., New York City.

2:40 External Rotation of the Tibia in Flaccid Paralysis.

GERALD G. HIRSCHBERG, M.D., Lecturer in Medicine (Physical Medicine), Stanford University School of Medicine, Stanford; Chief, Department of Physical Medicine and Rehabilitation, Alameda County Institutions, Alameda County, Calif., and

LEON LEWIS, M.D. (by invitation), Lecturer in Medicine, Stanford University School of Medicine, Stanford; Chief, Poliomyelitis Service, Alameda County Institutions, Alameda County, Calif.

The deformity of external rotation of the tibia has been described mainly in poliomyelitis, but it can be found in other forms of paralysis. It has been attributed by some to tightness of the iliotibial band. It is the purpose of this paper to show, through case studies, that gravity is the determining factor. Prevention of this deformity is always possible, but correction is difficult. The anatomical reasons for this and the roll of the cruciate ligaments are discussed.

DISCUSSANT: Herman J. Flax, M.D., Sanitree, P. R.

3:00 Further Studies on the Treatment of Lymphedema.

G. KEITH STILLWELL, M.D., Ph.D., Consultant, Section of Physical Medicine and Rehabilitation, Mayo Clinic; Instructor in Physical Medicine and Rehabilitation, Mayo Foundation, University of Minnesota;

JOHN W. B. REDFORD, M.D. (by invitation), Fellow in Physical Medicine and Rehabilitation, Mayo Foundation, University of Minnesota, and

FRANK H. KRUSEN, M.D., Professor of Physical Medicine and Rehabilitation, Mayo Foundation, University of Minnesota; Head, Section of Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minn.

A number of patients with lymphedema of the upper extremity following radical mastectomy were treated with the vasopneumatic apparatus, the time-honored procedure of elevation of the extremity with manual massage to reduce edema, and muscle setting exercises to increase lymphatic and venous flow. Elastic supporting bandaging was used continuously during the

day. When the patient learned how to do the elevation, exercises, and bandaging, she carried these on at home without assistance. The progress in the reduction of the edema has been followed by volumetric measurements of the limb by displacement of water. In most instances the program has been successful in producing a significant reduction in limb size and discomfort. Among the essential features contributing to success are believed to be the supporting bandaging and the fact that the patient is taught to carry on treatment independently.

Discussant: William Bierman, M.D., New York City.

3:20 The Effects of Delayed Electric Stimulation on Experimentally Denervated Muscle.

KHALIL G. WAKIM, M.D., Ph.D. (by invitation), Department of Physiology, Mayo Clinic, Rochester, Minn.

The effects of immediate and delayed electric stimulation were compared in an attempt to determine whether delayed electric treatment would help denervated muscle in a manner commensurate with the help afforded by immediate electric stimulation. Adult albino rats were used—normal controls and seven groups denervated by excision of a long segment of the sciatic and femoral nerves of the left extremity at the base of the thigh. At the end of the treatment period of 30 days the tendo achillis of the left leg in each rat was separated from its insertion and connected to the work output machine for determination of the initial and total work output of the gastrocnemius, soleus, and plantaris muscles. The findings clearly indicate that delayed electric stimulation did not improve the work output and endurance of denervated muscle.

Discussant: Charles Long, II, M.D., Cleveland.

3:40 Second Report on Disturbances of Space Perception in Hemiplegic Patients.

MIECZYSLAW PESZCZYNSKI, M.D., Assistant Professor of Physical Medicine and Rehabilitation, Department of Medicine, School of Medicine, Western Reserve University, Cleveland, and

JAN H. BRUELL, Ph.D. (by invitation), Assistant Professor of Psychology, Department of Psychology, School of Medicine, Western Reserve University, Cleveland.

The present report, an extension of our research on disturbances of visual space perception in hemiplegic patients, indicates that kinesthetic space perception is also involved in hemiplegics. A series of "interference" experiments is also presented. In this type of experiment the patient is required to judge the position of objects in the presence of disturbing background stimuli. Such interfering stimuli affect hemiplegics much more than some other patients with injuries to the brain or spinal cord. This has implications for gait training inasmuch as the environment is ordinarily filled with disturbing stimuli.

Discussant: Odon F. von Werssowetz, M.D., Gonzales, Texas.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 14—9 A.M.

Surf Room

Presiding—HERMAN J. BEARZY, Dayton, Ohio.

Assisting—ERNEST F. ADAMS, Warm Springs, Ga.

9:00 Rehabilitation Services in the Municipal Hospitals in New York.

BRUCE B. GRYNBAUM, M.D., Assistant Clinical Professor of Physical Medicine and Rehabilitation, NYU-Bellevue Medical Center; Director of Physical Medicine and Rehabilitation, Department of Hospitals, City of New York, New York City, and IRVING M. FRIEDMAN, M.S.P.H., LL.B. (by invitation), Clinical Instructor, NYU-Bellevue Medical Center; Assistant Director of Physical Medicine and Rehabilitation, Department of Hospitals, City of New York, New York City.

The Department of Hospitals of the City of New York initiated the first Municipal Rehabilitation Department in the country. A short historical sketch on Physical Medicine and Rehabilitation Services in the City's thirty hospitals, beginning with the pioneer Bellevue Department and going on to all other hospitals, which together constitute the largest rehabilitation service outside of the Veterans Administration is given. Experiences in operating and coordinating the service and the principles learned from providing direct patient care as well as from our relations with other community services are discussed.

9:15 Stair Climbing as Exercise.

GERALD G. HIRSCHBERG, M.D., Lecturer in Medicine (Physical Medicine), Stanford University School of Medicine, Stanford; Chief, Department of Physical Medicine and Rehabilitation, Alameda County Institutions, Alameda County, Calif.

In rehabilitation, stair climbing is generally considered an activity of daily living which must be mastered. Stairs in the Physical Therapy Department are used as "training stairs." This paper emphasizes the use of stair climbing as an exercise for weak lower extremities. Its advantages over manual resistance, pulley or boot exercises for strengthening are numerous: simultaneous exercise of several muscle groups, facilitation because of primitive pattern, economy of self exercise and group exercise. For coordination, stair climbing is simpler and more effective than Frenkel exercises and "gait training" because step width and height offer a two dimensional guide to the foot. Finally, stairs are readily available in hospitals and in most homes. Indications for stair climbing, prerequisites and technics are discussed.

9:30 Muscular Dystrophy—Diagnosis, Prognosis, Evaluation and Management: The Role of Physical Medicine and Rehabilitation.

MAX K. NEWMAN, M.D., Director, Department of Physical Medicine and Rehabilitation, Detroit Memorial Hospital and Sinal Hospital;

CHARLES DURANDO, B.S., R.P.T. (by invitation), Chief, Physical Therapy, Detroit Memorial Hospital, and

BARBARA JEWETT, B.S., O.T.R. (by invitation), Chief, Occupational Therapy, Detroit Memorial Hospital, Detroit.

The problem of muscular dystrophy can be perplexing and frustrating because of its clinical variants. Other muscular atrophy diseases as cerebral palsy and poliomyelitis are fixed neuromusculoskeletal deficits, but muscular dystrophy has unstable facets in its medical management. Hence, diagnosis, prognosis and evaluation, and management cannot follow ordinary medical concepts. The neurological diagnosis, by its broadness of approach, may result in a confusion of terms and clinical impressions, i.e., fibrillation and fasciculation, dystrophy and atrophy, and the like. Prognosis and evaluation become logical concepts by careful range of motion, activities of daily living and muscle testing methods. It is possible to chart the course of deterioration or stability of the patient by a specially designed group of such tests. Hence, evaluation and training programs, therapy programs, vocational programs and the like can be determined. Therefore, a long range concept of treatment can be devised for the average patient. Management by physical means is the apparent answer to the present problem of muscular dystrophy.

9:45 Role of Physical Medicine and Rehabilitation Service in the Member-Employee Program.

JACOB L. RUDD, M.D., Special Instructor, Tufts Medical School and Boston-Bouve School of Physical Therapy, Boston; Chief, Physical Medicine and Rehabilitation, Brockton VA Hospital, Brockton, Mass.

10:00 50 Years of Food and Drug Administration: Protection With Special Relation to Medical Devices.

IRVIN KERLAN, M.D. (by invitation), Associate Medical Director; Chief, Research and Reference Branch, Division of Medicine, Department of Health, Education and Welfare, Washington, D. C.

The growth and changes in federal food and drug legislation since the passage of the Food and Drugs Act of 1906 are traced. The major developments of the Federal Food, Drug, and Cosmetic Act of 1938 are presented. The control of medical devices and the requirements relating to them are detailed. Legal prohibitions in the Act and the ways in which the Government enforces them are delineated. The physician plays an important role in relation to effective control activities in the device field. With regard to the future of the therapeutic device program suggestions are offered which will serve to promote safe and honestly labeled devices in the interest of the public health and welfare.

10:15 Protean Symptomatology Caused by Nasal Sinusitis Showing Minor X-Ray Changes.

W. GORDON RICH, M.B., D.M.R.E. (Cambridge) (by invitation), Radiologist, St. George's Hospital, Christchurch, New Zealand.

A discussion of the symptomatology and X-Ray changes that are commonly observed are detailed. The systemic effects of sinusitis with particular reference to the endocrine system are noted. The results of the ultra-short wave therapy of nasal sinusitis are discussed. Reference is made to the special advantages of a rotating electrode. Statistics and some case records are presented.

10:30 Conservative Management of Certain Types of Back Problems: Analysis of Results.

EDWARD M. KRUSEN, JR., M.D., Medical Director, Department of Physical Medicine and Rehabilitation, Baylor University Hospital, and DOROTHY FORD, M.D. (by invitation), Dallas, Texas.

This is a study of approximately 500 cases of acute low back strain treated in the Baylor University Hospital Physical Medicine Department during the past five and one-half years. These cases have been subjected to statistical analysis of the relationship of duration of symptoms before treatment and the relationship of compensation for injury to the result obtained, the number of treatments given and the number of days of hospitalization.

SUPPLEMENT

Papers here listed will be read by title. All papers in this group will be submitted for publication in the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION.

Economical Utilization of Therapy. GERALD G. HIRSCHBERG, M.D., and LEON LEWIS, M.D., Berkeley, California.

A New Hydrotherapeutic Tank (One Year's Experience). RALPH E. WORDEN, M.D., Columbus, Ohio.

SCIENTIFIC EXHIBITS

Liberty Mutual Insurance Company, "The Rehabilitation Center—Its Role in Recovery." W. SCOTT ALLAN.

Quantitative Estimation of Post-Poliomyelitis Paresis. WILLIS C. BEASLEY, Ph.D.

The Hemiplegic Rehabilitation Process. CHARLES R. BROOKE, M.D., and THOMAS J. D. SCANLAN, M.D.

Muscular Dystrophy Associations of America, Inc., "Manifestations of Muscular Dystrophy." TOBY COHEN.

Total Rehabilitation of Chest Diseases. ALBERT HAAS, M.D., and HOWARD A. RUSK, M.D.

Medical and Prosthetic Problems of the Lower-Extremity Amputee. VERNE T. INMAN, M.D.; GREGORY BARD, M.D.; HENRY E. LOON, M.D., and CHARLES W. RADCLIFFE, M.S.

Rehabilitation Follow-Up—A Medical Responsibility in Treating the Whole Man. A. B. C. KNUDSON, M.D.; F. J. BALSAM, M.D., and J. H. VAN SCHOICK, B.S.

Safety—A Factor in Functional Training of the Disabled. MORTON HOBBERMAN, M.D.; ERBERT F. CICIENIA, and HYMAN L. DERVITZ.

Back Pain in Industry. EARL F. HOERNER, M.D.

Speech Therapy for the Brain Injured. KEITH C. KEELER, M.D.

50 Years of FDA. Health Protection for You and Your Patient. Food and Drug Administration, Department of Health, Education, and Welfare. IRVIN KERLAN, M.D.

Using Adaptive Equipment to Achieve Vocational Goals in the Rehabilitation of Poliomyelitis Cases. MILAND E. KNAPP, M.D.; PAUL M. ELLWOOD, M.D.; DOUGLAS FENDERSON, and GEORGE JEYS.

Rehabilitation of the Poliomyelitis Patient with Respiratory Paralysis. LEON LEWIS, M.D.; GERALD G. HIRSCHBERG, M.D., and J. PATRICK ADAMSON, M.D.

A New Method for the Treatment of Periphrical Vascular Diseases. Syncardial Pressure Impulses Used in Treatment of Periphrical Vascular Disease. JAMES F. LYONS, M.D., and BURTON MEADOWS, M.D.

The Management of Spastic Paresis. LT. COLONEL RAOUL C. PSAKI, MC; WALTER J. TREANOR, M.D.; LT. COLONEL ERNST DEHNE, MC, and WILLIAM M. GILMORE, CAPTAIN, MC.

Electromyography in Clinical Practice.

ARTHUR A. RODRIGUEZ, M.D.; Y. T. OESTER, M.D.; JOHN FUDEMA, and J. A. FIZZELL.

The Effectiveness of Brief Maximal Exercise on the Strength of the Quadriceps Femoris. DONALD L. ROSE, M.D.; STANLEY F. RADZYMSKI, M.D., and RALPH R. BEATTY, M.D.

National Society for Crippled Children and Adults, Inc. "Rehabilitation Literature—Library Service of the National Society for Crippled Children and Adults." JAYNE SHOVER.

American Board for Certification: "Its Brace Terminology Project and Other Activities Intended to Serve the Physiatrist." LESTER A. SMITH.

Rehabilitation of Poliomyelitis Patients with Respiratory Involvement. HART E. VAN RIPER, M.D.

TECHNICAL EXHIBITS

AMERICAN HOSPITAL SUPPLY CORP. — Booths 42 and 43

American Hospital Supply Corporation, Evanston, Ill., will feature many new developments in rehabilitation equipment including the Electro-Matic Chair, Monaghan Ventilation, Tomic Rocking Bed with Chest Shell Pump attached, versatile Polecat Equipment, Multi-Controller, Maske-Typer, Folding Walkers, and the Bennett Ventilation Meter.

THE BURDICK CORP. — Booths 1 and 2

The Burdick Corporation will exhibit in booths 1 and 2 their line of Physical Therapy Equipment. Of especial interest will be the line of Ultrasonic Therapy Equipment and Microwave Diathermy.

S. H. CAMP AND CO. — Booth 4

The CAMP exhibit in booth 4 features Supports and Appliances used in therapy treatment: Orthopedic Supports for men, women and children; Pelvic, Leg and Cervical traction apparatus; Plastic and Blair Braces; Cervical Collars (Lewin, Thomas, Shantz, etc.); a new Hyperextension Brace, and Head Halter Kits. Investigate the latest development in these scientifically designed Supports and Appliances. See how they can best meet your exacting requirements. Patients appreciate their comfort, quality and low cost.

CHATTANOOGA PHARMACAL CO., INC. — Booth 37

The new Model D-3 Master Unit (a compact two-Pack heater), the answer to the many requests for an inexpensive unit, will be shown and demonstrated. This basic, effective therapy is rapidly becoming standard with orthopedists across the nation. It is ideal for your stubborn backs and necks, your arthritic cases, and a wide variety of other therapy problems—a tremendous aid in conjunction with cervical traction, in reducing spasm and pain.

THE COCA-COLA CO. — Booth 40

Ice-cold Coca-Cola will be served through the courtesy and cooperation of the Atlantic City Coca-Cola Bottling Company, and The Coca-Cola Company.

CONITECH, LTD. — Booth 20

In addition to the universally accepted "Huxley," Conitech, Ltd., will show a completely new, unique, and versatile Respirator that greatly facilitates nursing care, will adequately ventilate the most debilitated patient, and incorporates the principles of artificial respiration, by a small pulsating abdominal belt, cuirass, and positive pressure. A simultaneous combination with one patient, of cuirass and positive pressure, or abdominal belt and positive pressure, can be accomplished with the new device.

COSMEVO SURGICAL SUPPLY CO. — Booth 25

The following products will be exhibited: Cosmevo Drop Foot Aider, Walk Aider, P.A. Brace-(Pull & Adjust), Ambul-Aider, The Nicola Stapler and Attachments; as well as other orthopedic instruments.

DALLONS LABORATORIES, INC. — Booths 44 and 45

This year, DALLONS LABORATORIES, INC., will display a most interesting group of Electro-Medical instruments. Besides our two Medi-Sonar Ultrasonic units, we shall display our Medi-Therm diathermy, Medi-Quartz ultraviolet equipment and two new streamlined additions to our Medi-Sine line of muscle stimulators and galvanic units. In addition to the equipment listed, DALLONS has entered the field of Cardiovascular research with the announcement of their new Cardiophone and Cardioscope, Cardiac Pacemaker and Defibrillator. We will welcome you to our booth.

ENCYCLOPAEDIA BRITANNICA — Booth 12

A Special Exhibit Offer, Featuring the New 1956 Edition of Encyclopaedia Britannica, together with Publications and Services of Unusual Importance and Value, will be explained during the 34th Annual Session of the American Congress of Physical Medicine and Rehabilitation. The New 1956 Edition of Encyclopaedia Britannica represents more than 12 years of intensive editorial revision, requiring an investment of more than \$4,000,000.00. We take great pride in presenting our Biggest Release in nearly 200 years.

EVEREST & JENNINGS, INC. — Booths 15 and 16

Complete line of the famous E & J Wheel Chairs, Walkers, Commodes and Patient Lifters will be displayed. See the new "Power Drive" Wheel Chair and the Demonstration Wheel Chair.

H. G. FISCHER & CO., and TECA CORP. — Booth 3

Latest models of Modern F.C.C. approved Ultrasonic Generators, Short Wave Diathermy Units, Low Voltage Generators and Equipment for Electrodiagnosis, all of highest quality materials and construction, will be on display. Representatives in attendance will welcome an opportunity to give demonstrations and quote today's low prices. Your visit will be appreciated.

J. E. HANGER, INC. — Booth 41

Modern prosthetic devices for upper and lower extremity amputees will be displayed by the Hanger Organization offering a complete service to the amputee. A representative will show you the Hanger Suction Socket limb and the recent improvements for upper extremity prostheses.

HANOVIA CHEMICAL AND MANUFACTURING CO. — Booth 10

Hanovia will exhibit a complete line of Physical Therapy Equipment. Lamps for orificial and body irradiation; Sollux Radiant Heat Lamps; Germicidal lamps for destruction of air-borne bacteria will be demonstrated by competent and courteous representatives.

HERBST SHOE MFG. CO. — Booth 14

CHILD LIFE Shoes are made in two types of construction, Regular and Arch Feature. Each of these shoe constructions features Cordovan Horsehide leather soles, leather counters, Spring steel shanks, sueded leather linings, specially compounded rubber heels, combination lasts for snugger heel fit, proper ball width and ample toe room. Authorized dealers are in all major cities.

HILL LABORATORIES CO. — Booth 17

Hill Laboratories Company will demonstrate the Hill Traction Table for intermittent or steady traction, and the Mobile Hill Applicator for moist or dry heat.

ILLE ELECTRIC CORP. — Booth 35

HYDROMASSAGE SUBAQUA THERAPY EQUIPMENT. Ille Electric Corporation will demonstrate in booth 35 how the care of infantile paralysis, arthritis, and other disabling conditions can be greatly improved by the use of Hydromassage Subaqua Therapy Tanks. Also on display will be a Mobile Whirlpool Bath with Mobile Adjustable High Chair and Paraffin Bath.

LA BERNE MFG. CO., INC. — Booth 34

La Berne Manufacturing Company will exhibit several new items in addition to the "Walk-Off" table and Parallel Bars. New items will include an adjustable over-bed Shoulder Wheel. This wheel is built to be used with bed-ridden patients over their bed or in a wheel chair. It is mounted on casters and is adjustable to any degree of height and to any angle of circular motion. Another new item to be shown is a Resistance Exerciser which offers a new field in resistant exercises.

THE LIEBEL-FLARSHEIM CO. — Booth 7

The Liebel-Flarsheim Company cordially invites you to visit booth 7 in which their latest electromedical-electro-surgical equipment will be exhibited. We ask particularly that you stop and see the L-F Basal Meter, the first automatic, self-calculating metabolism unit ever offered. Capable representatives will be on hand at all times.

R. J. LINDQUIST CO. — Booth 38

At the R. J. Lindquist Company booth will be displayed new models of the CHRONOSONIC Ultrasound, the CHRONOWAVE Stimulator, a new "miniaturized" Portable Short Wave, the Portable CHRONAXIMETER, and two models of DESERT SUN Lamps.

PAUL J. MANDABACH, INC. — Booth 13

Headquarters for information on uses and distribution facilities of Physical Medicine and Rehabilitation Equipment, Machines, Furniture, Instruments, Accessories and Supplies for use in the Clinic, Laboratory, Workshop and other special rooms and departments. Specifically: Anatomical Charts, Monographs, Books and Record Forms, Electronic Muscle Stimulators, Vaginal, Rectal and other Electrodes, Diathermy, Ultrasonics, Air Conditioning, Signals, Tables, Beds, Stretchers, Floor Maintenance, Uniform Gowns, Splints, Crutches, Anatomical Supports, Adhesives, Antiseptics, Disinfectants, Germicides, Deodorants. Whatever you want we can tell you where and how to get it.

MEDCO PRODUCTS CO., INC. — Booth 39

The MEDCOLATOR Stimulator, for the stimulation of innervated muscle or muscle groups ancillary to treatment by massage, is a low volt generator that will generate plenty of your interest. Electrical muscle stimulation is a valuable form of rehabilitation therapy. Be sure to visit our booth for a personal demonstration.

MEDCRAFT ELECTRONIC CORP. — Booth 47

Medcraft Electronic Corporation will exhibit its new Electromyograph, displaying for the first time, an instrument capable of presenting a well-resolved graphic record of muscle potentials. Also on display, will be Medcraft's two Ultrasound therapy units. Technical representatives will be available to discuss the instruments.

THE MEDITRON CO. — Booth 5

ELECTROMYOGRAPHS by MEDITRON, the original and leading company in this field. One and two channel ELECTROMYOGRAPHS and the MEDITRON Stimulus Control Unit with which Nerve Conduction Time Studies can readily be made on MEDITRON ELECTROMYOGRAPHS will be demonstrated. See the Square Wave CONSTANT CURRENT IMPULSE STIMULATORS and CHRONAXIMETERS.

MOORADIAN HIGH FREQUENCY LABS. — Booth 6

The Mooradian High Frequency Laboratories will show the well known Model "R" self-stabilized Short Wave Diathermy apparatus; a new Modulated Current Low-Volt Generator; the Castroviejo Electro-Surgical Ophthalmic Unit for Retinal Detachment and Cyclodioltherapy; as well as an improved Cardiac Defibrillator of exceptionally rugged construction and simple operation, the Columbia-Presbyterian Model.

PORTO-LIFT MFG. CO. — Booth 8

The original producer of invalid lifting equipment, PORTO-LIFT MANUFACTURING pioneered the development of bed patient transfer facilities. The sturdily constructed PORTO-LIFT is completely mobile, utilizing easy-to-operate hydraulic action that eliminates physical strain on attendant . . . ensures smooth and comfortable patient transfer from bed to wheel chair, conventional chair, automobile and bath. With the additional accessories available, every lifting and transfer problem can be met.

J. A. PRESTON CORP. — Booth 9

J. A. Preston Corporation, offering the most complete line of Equipment for Physical Medicine & Rehabilitation, is showing selected items of interest to the Physiatrist. On display will be DIAGNOSTIC APPARATUS including the NEWMAN MYOMETER; oscillometers and skin temperature units; CEREBRAL PALSY EQUIPMENT; latest EXERCISE DEVICES; Aids for Activities of Daily Living; SPECIAL CRUTCHES and CANES; and selected PMR BOOKS.

RAYTHEON MFG. CO. — Booth 19

Electronic and Ultrasonic pioneering and a vigorous program of investigation and development have resulted in the Raytheon Microtherm and Ultrasonic therapy equipments. These tried and proved modern equipments should be a must on your "See List." Plan your busy schedule to include a demonstration. Factory representatives will be on hand to answer your questions.

THE RIES CORP. — Booth 36

Moisture Heat Therapy Equipment delivers safe, comfortable, and effective moist heat at the desired treatment temperature. This physiologically sound procedure increases the volume of local blood flow measurably and can be applied either locally or generally. It has been used consistently since 1937 and leading physicians throughout the nation have prescribed it for such cases as acute and chronic low back strains, arthritis, post fracture care, bursitis, polio, and other industrial and orthopedic problems.

THERMO-ELECTRIC CO. — Booth 18

THERMO-ELECTRIC COMPANY will display the Dickson Paraffin Baths which were pioneered and developed in cooperation with Cleveland Hospitals where they have been in continuous use for the past 16 years. Noteworthy features are the mahogany mouldings designed for the comfort of the patient; double control of the melting element insuring maximum safety; and patented drain. Several models will be shown.

TRU-EZE MFG. CO., INC. — Booth 33

TRACTION AT HOME . . . Our representatives will welcome the opportunity to demonstrate how your patients can continue using cervical, pelvic or extremity traction after hospital release. With TRU-EZE Traction Sets, the less severely injured, after proper instructions, can be encouraged to continue treatment at home. Ethically promoted, these simple and economical traction items are available on prescription only.

THE WHITEHALL ELECTRO MEDICAL CO., INC. — Booth 46

Visit the Whitehall booth for a personal demonstration of the Whitehall "One Motor" Mobile Whirlpool Bath in which the turbine assembly functions as both agitator and emptying device — agitation and emptying combined into a single motor driven system. Get the complete story on the Whitehall line of advanced hydrotherapy equipment.

ZIMMER MFG. CO. — Booth 11

Zimmer Manufacturing Company will exhibit and demonstrate the New Hausted Tractionaid for intermittent and steady traction. It is hydraulic, electronical, and compensates for movement of patient; tension and timing are perfectly controlled. Special emphasis will be placed on the Newman Myometer which is a new instrument for the measuring of muscle strength. Many other items for physical medicine and therapy will be shown.



"Don't you think Smedley is overdoing this team approach business!"

physical medicine abstracts

Posterior Inferior Cerebellar Artery Syndrome of Wallenberg After Chiropractic Manipulation. C. A. Schwarz, et al. A.M.A. Arch. Int. Med. 97:352 (Mar.) 1956.

Damage to spinal cord and spinal roots have reportedly followed chiropractic manipulation. Damage to intracranial structures seems more remote. However, to correct the latter impression, the authors report a 28-year old woman who developed a classical posterior inferior cerebellar artery syndrome following a chiropractic manipulation of the neck in "treatment" of a "head cold." No other cause for this disorder could be uncovered. She made an uneventful recovery within three months.

The authors comment on three other patients who showed injury to the brain stem following chiropractic manipulation. Two of these patients revealed thromboses of the vertebral-basilar arterial system at post mortem. The authors postulate that while direct tearing and stretching can explain spinal cord and root damage as a result of manipulation, injury to the brain stem must be explained on the basis of interference with the blood supply. Some workers have found that although the vertebral arteries are very flexible in order to meet the wide mobility of the occipito-atlantal and atlas joints, circulation through one vertebral artery can be seriously impaired if the head is hyperextended and tilted to the opposite side. Variations in size and position of vertebral arteries can occur and in such cases the arteries would be particularly susceptible to unusual stresses. Furthermore, the posterior inferior cerebellar artery is readily compressible since it lies closest to the foramen magnum.

The authors conclude that if Wallenberg syndrome is seen in a young individual, traumatic causes such as manipulation, should be sought; and if trauma is the cause, prompt use of anticoagulants may be life saving.

The Future of the Deaf Child. R. W. Fanjoy. Canad. M. A. J. 74:533 (Apr.) 1956.

In this excellent essay on the problems of the deaf child, the author discusses the problem in the form of questions by the parents and how the doctor should answer them. These are summarized as follows:

1. *Will my child ever talk?* Yes, he will learn to talk providing he is trained early to

use tactile and visual clues to learn how to form sounds. His voice, nevertheless, will be a monotone for he cannot learn to modify the voice for emphasis and inflection.

2. *Will my child ever hear?* No training will improve hearing, but through learning to lip read he can use residual hearing to better advantage.

3. *Could nervousness be the reason why my child does not talk?* No, although your child may appear more nervous and restless than usual, he is constantly on the move in order to use visual and tactile clues for behavior instead of auditory ones. His movements are purposive; those of a nervous child are not.

4. *Can my child be fitted with a hearing aid?* Each case is individual and depends on hearing loss, but the necessary amplification must not be such that discomfort in the ear is produced.

5. *If we have another baby, will he also be deaf?* If there is deafness in the family background, future babies may be deaf; but if it is acquired, e.g., by rubella in the mother during pregnancy, future babies will be normal.

6. *How should I handle my deaf child?* Three guiding principles are: (a) Give every opportunity for seeing words, phrases, etc., to initiate him in lip reading. (b) Treat him as normal in every way possible. (c) Omit use of sign language as this only discourages lip reading and is difficult to break down.

7. *Why can't we wait until my child is 8 or 9 years old?* As a child becomes older, his memory for lip movements, etc., becomes poorer so start as early as possible.

8. *How long will my child attend school for the deaf?* In the absence of other handicaps such as mental retardation and with early training, many children will enter regular school sometime during elementary school years. However, he will have to continue speech and language training along with regular school subjects.

In summary, the four cardinal virtues in training a deaf child are (1) faith, by the parents—in the physician that the diagnosis is right, in the school for training, and in the child; (2) hope, by the school that the parents will cooperate fully in the training program; (3) understanding, by the public that they must do all that is needed to help overcome the handicap, and (4) guidance, by the physician in successful rehabilitation.

Should the Patient with a Healed Myocardial Infarction Avoid Physical Exertion? W. J. Walker. J. Am. Geriatrics Soc. 12:959 (Dec.) 1955.

The author believes that the answer to the question in the title of this article needs critical reconsideration.

Seventy-seven per cent of soldiers killed in Korea (average age, 22.1 years) had coronary atherosclerosis. If physical exertion is dangerous for arteriosclerotic persons, then almost all adult males should stop physical exertion as nearly all have this disease. Recent studies are quoted which show that sedentary workers have up to 50 per cent higher mortality and have a shorter survival rate from coronary occlusion than do laborers. Furthermore, many studies indicate that very few coronary occlusions are precipitated by actual physical exertion. The theory that coronary thrombosis is produced by capillaries rupturing through atheromatous plaques when the patient overexerts is not proved experimentally and is theoretically untenable. The capillaries lie within the wall of the coronary artery and any increase in pressure within the lumen brought on by exertion would actually support such capillaries and prevent their rupture.

Following the formation of a firm scar there are only two reasons to restrict activity in a patient with myocardial infarction: (1) extensive myocardial damage with cardiac insufficiency producing dyspnea on exertion and (2) coronary insufficiency with angina or cardiac arrhythmia induced by effort.

Restricting activity in a patient who has survived a coronary infarction probably shortens his actual survival and certainly shortens his useful life.

Some Practical Aspects on the Rehabilitation of Paraplegics. H. L. Heyl. J. Neurosurg. 13:184 (Mar.) 1956.

The author was an active neurosurgeon who became a paraplegic several years ago. As a result of his rehabilitation program he points out that from a practical standpoint the average paraplegic must use a wheelchair to earn a living. He believes that the importance of crutch walking is perhaps overemphasized in the rehabilitation program. Likewise, he believes that the tendency in the programs for bladder training in America to discourage the use of stress incontinence urinals, on the grounds that they lead to loss of good habits, is partially unrealistic.

Some of the preoccupations of the paraplegic patient include sensory discomfort, social insufficiency and financial insecurity. Intense enthusiasm and new increments of social independence are important therapeutic agents for sublimation of these detrimental preoccupations. How to invoke the aid of these two factors is discussed. An individualistic search for interests which bring

about an enthusiastic response in the paraplegic patient and contact with normal people are very important. A sense of social independence can be increased by modification of the home so as to adapt it to the patient's needs; acquisition of ability to drive one's car; and provision and preparation for earning a living.

Damaging Effects of Strenuous Exercise. G. H. Hess, et al. U.S. Armed Forces M.J. 7:369 (Mar.) 1956.

One hundred seven men on active military duty were given complete general examinations, including chest x-ray, electrocardiogram, and urinalysis. All studies were normal. Thirty-six men were over 30 years of age. The Harvard Step Test for Cardiac Functional Fitness was given before the start of physical training and at the end of the training period. The training period was of two weeks' duration.

Three of four men, all over 30 years of age, developed physical abnormalities immediately and were unable to complete the program. Scores attained in physical fitness tests improved considerably over a period of two weeks. However, there was no significant improvement in the general capacity of the body to adapt itself to, or recover from, hard work. Neither was there any significant change in vital capacity. The study indicates that physical training of this type is not the determining factor in the prevention of cardio-circulatory damage from unusual physical activity. Physical training programs should consider the lesser abilities and potentials of men over 30 years of age.

Flexor Tendon Injuries: A Review of Results. G. H. Morley. Brit. J. Plast. Surg. 8:300 (Jan.) 1956.

A consecutive series of 72 cases of injury to flexor tendons in the forearm, palm, fingers, and thumb is surveyed as to results following secondary repair according to the technic of Rank and Wakefield. Grafts were taken from the tendons of the palmaris longus, if present, or from the extensor of the second toe.

Hyperextension of the proximal interphalangeal joint resulted in three cases. This led to a change in technic involving the paratenon in the finger.

At first the part was immobilized for 21 days, but results were no better than when 10 days of immobilization were used. Twelve days of immobilization was used as a compromise, following which patients were encouraged to exercise without removal of the dressings and without attempting to be strenuous. An initial promising indication of good mobility usually is not persistent. Good mobility, despite faultless physical and occupational therapy is often slow to return for the first

month or two; however, at this time there may be dramatic improvements within a week or so.

The results of treatment are analyzed and various factors, such as infection, crushing at time of injury, delay in repair, failure of or inadequate repair are discussed in regard to the several tendons involved in this series of cases. Twenty-nine of 49 cases obtained excellent or good results. Good result was one in which there was full extension and flexion to within one inch of the mid-palmar crease.

Osteoporosis—A Geriatric Problem. A. M. Rechtman, et al. J. Am. Geriatrics Soc. 1:70 (Jan.) 1956.

This is a resumé of the more important points in this article which summarizes the present views on osteoporosis.

Osteoporosis is primarily a geriatric problem for it occurs most commonly after the age of 50. Three main factors are involved in producing and maintaining normal bone architecture: (1) steroid hormone balance—balance between the anabolic androgens and estrogens and the catabolic processes; (2) mechanical stresses and strains—these are needed stimuli for normal osteoblastic activity; (3) nitrogen building blocks—protein is needed for the organic supporting matrix of bone. Disturbance of any of these three factors leads to osteoporosis.

Osteoporosis is most common in women past the menopause, but it is present in 25 per cent of both men and women over 65 years of age. Factors in its production in these people include lack of sex hormones, lack of activity and dietary deficiencies (older people often eat very little meat). Drug induced osteoporosis, e.g., by ACTH or cortisone, often must be considered.

Diagnosis is made by x-ray and the commonest sites of occurrence are in the spine, pelvis and femur. Fewer osteophytes are seen than in normal individuals. A backache often means a compression fracture, and hip discomfort may mean a fatigue fracture of the neck of the femur. Trauma is usually minimal in these cases.

Treatment of osteoporosis is: Preventative—general activity should be encouraged if some part is immobilized and the individual should be on a high protein diet with adequate vitamins. Medical—steroid hormones, including androgens and estrogens, salicylates for pain should be used. Orthopedic—bed boards and effective, light supports that the patient will wear, should be used.

Rehabilitation of the Elderly Patient With Pinned Fracture of the Hip. M. Pescezyński. J. Chron. Dis. 3:311 (Mar.) 1956.

The author advocates a "middle of the road" course in the rehabilitation of elderly patients with pinned fractures of the hip. Early ambulation, made possible by Smith-Peterson nailing and its modifications, and rigid immobilization of the fracture parts and avoidance of early weightbearing are the extremes. The basic concept includes meticulous diagnostic evaluation and reconditioning of the patient; early limited weightbearing to facilitate crutch walking and to make it feasible and safer for the elderly patient, and late full weightbearing.

The physical therapy administered does not differ from that in general use. Preambulation training, including graduated standing exercises, is described. It is pointed out that the classical 3-point crutch gait may be subject to many modifications in the elderly, chiefly because of the patient's feeling of insecurity on crutches. These modifications should be accepted rather than forcing a debilitated person to do that which he fears. Likewise, in crutch walking the elderly patient should be allowed to bear some weight on his shoulders. The author has seen no instances of crutch paralysis as a result of this practice. Ischial weightbearing calipers have been disappointing to the author in elderly patients because of interference with walking performance. A home evaluation should be made prior to discharge in which suggestions are given according to the rules accepted in training in Activities of Daily Living. Full weightbearing by use of cane or canes is gradually attained at the proper time, according to serial x-ray findings.

Electromyogram of Rectus Muscle. A. J. Magee. Am. J. Ophth. 41:275 (Feb.) 1956.

The method consisted of two monopolar wire electrodes introduced into the lateral rectus muscle, approximately 5 mm. apart. Free movement of the globe is possible and the origin of the motor potentials cannot be doubted. The lead nearest the cornea is the indifferent, the other the active lead. A Dumont oscilloscope model 322 with a pre-amplifier was used. Needle electrodes are more suitable for studying motor potentials, but wire electrodes possess certain advantages in recording.

Limited evidence was presented to indicate that the motor potentials of the human ocular muscles are about 15 microvolts to several times this in amplitude and about one millisecond in duration.

The firing of the motor unit in the lateral rectus is at a minimum when the subject gazes at infinity (a kind of "at rest" state). However, when the subject fixed his eyes on a definite object straight ahead, the EMG showed a definite firing of motor units. This might be called an isometric contraction.

When the globe is abducted, the amount of motor unit firing is roughly proportional to

the degree of abduction. If the globe is in an abducted position, the amount of motor unit firing is roughly the same for nearly all degrees of adduction. This varies somewhat with isotonic or isometric contractions. When the globe is in the depressed or elevated position, activity of lateral rectus appears similar to that when the eyes are in the straight position. During isotonic movements up or down in the zero meridian, the lateral rectus shows increased activity, which probably is a guiding action. Convergence and divergence are oscillating movements of the globe with alternate contraction and relaxation of the muscle until the point of stabilization is reached.

A Survey of the Neurological Results of 858 Spinal Cord Injuries. A Comparison of Patients Treated With and Without Laminectomy. A. E. Comarr, and A. A. Kaufman. J. Neurosurg. 13:95 (Jan.) 1956.

In the series of 858 cases of spinal cord injuries, 579 had laminectomy at various intervals after injury and 279 did not. In the more severely injured laminectomized patients, 16 per cent were significantly improved and 8 per cent were ambulatory (1.2 per cent without aids), postoperatively. Twenty-nine per cent of the patients not operated upon were improved neurologically and 16 per cent were ambulatory (6 per cent without aids).

The intraspinal lesions of the nerves recovered more frequently than the lesions of the spinal cord. This was thought to be due to greater tolerance of the nerves of the cauda equina to trauma, rather than to regeneration. Systems conducting tactile sensibility recovered most frequently in all instances; pain, temperature and motor function recovered next most frequently; and bladder sensation and motor control least frequently.

Prognosis for recovery of function was most favorable when the interval between injury and operation was from 24 hours to one month. This was partially governed by the patient's general condition. Spinal subarachnoid blocks affected the prognosis adversely. Patients who had complete blocks and who were not operated upon did not improve. Observation of the cord at surgery did not afford a reliable indication of prognosis unless the cord was obviously transected. Subarachnoid block is a strong indication for surgery if there is any doubt as to completeness of nerve or cord injury. Absence of subarachnoid block supports institution of nonsurgical treatment initially. Laminectomy delayed as long as one year may rarely afford some improvement in cases of complete block, but if

delayed longer it probably affords only psychological benefit to the patient.

Ultrasonics in Ocular Diagnosis. G. H. Mundt, Jr., and W. F. Hughes, Jr. Am. J. Ophth. 41:488 (Mar.) 1956.

The authors present a very interesting preliminary report on the use of the ultrasonic Reflectoscope in diagnosis of various ocular conditions. The distances of various reflecting surfaces of the eye from the cornea can be determined with an accuracy not greater than one or possibly two millimeters. Simple serous detachments can probably be differentiated from those due to tumors. It is unknown whether tumors can be differentiated from lesions such as hemorrhage or scar tissue. There are interesting possibilities in the diagnosis and localization of nonradiopaque foreign bodies.

Numerous tracings of the reflections of the normal eye and of various tumors and retinal detachments are shown.

The Reflectoscope gives an intermittent type of ultrasonics, so that if the unit is held on an eye for 20 minutes the total exposure time is less than 1/10 of a second. The average output for the crystal is less than one milliwatt per square centimeter. There is no focusing of the waves which would facilitate thermal corneal opacities, cataracts, or liquefaction of the vitreous. A study of rabbits has been followed for seven months and none of these untoward effects has been noted.

Prosthetic Technics in the Aftercare of Diabetic Gangrene. E. Downie, and M. O'Connor. Diabetes 5:32 (Jan.-Feb.) 1956.

It is possible to care for infections and gangrene of the feet in diabetic patients by more conservative methods since the advent of antibiotics. This is especially important in elderly persons who seldom compensate for radical amputation of the lower limb, because of inability to learn to use or fear of use of artificial limbs. Conservative surgery of the foot providing the patient with an animated stump, no matter how anatomically grotesque, is very important in the elderly patient. A detailed description of the construction of a slipper prosthesis, modified from the pattern of Charlesworth, is given. Modification of shoes and boots, e.g., with metatarsal bars, used in conjunction with the prosthesis is considered. Three illustrative cases, each of which details a particular application of the technics, are presented.

book reviews

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Academy of Physical Medicine and Rehabilitation.

INTRODUCTION TO PSYCHIATRIC OCCUPATIONAL THERAPY. By Gail S. Fidler, O.T.R., and Jay W. Fidler, M.D. Paper. Price, \$4.00. Pp. 200. The MacMillan Company, 60 Fifth Ave., New York 11, 1954.

The reviewer does not feel competent to judge the adequacy of a book devoted to a treatment technic in psychiatry. Nevertheless the presentation of the subject seems reasonably full and there are interesting parallels and general principles of treatment equally valid in a rehabilitation center. These include: Augmentation of therapeutic efforts; assistance in diagnosis and personality evaluation; socio-economic factors; group identification and group therapy; chapters on prescriptions and on activity analysis, on progress notes and illustrative case histories complete the book.

It is recommended for both psychiatrists and occupational therapists.

VITAMINS AND HORMONES. Advances in Research and Applications. Vol. XIII. Edited by Robert S. Harris; G. F. Marrian, and Kenneth V. Thimann. Cloth. Price, \$9.00. Pp. 382. Academic Press Inc., 125 E. 23rd St., New York 10, 1955.

This volume deals with the latest advances in the field of vitamins and hormones. The book actually should be of some general interest, although many of the chapters go into great detail and probably could not be fully comprehended by anyone outside of closely associated fields.

Many of the questions which trouble clinicians are incapable of being answered at the present time. One of these general questions is whether or not it is wise or necessary to combine vitamins with antibiotics in the treatment of infectious diseases. The investigations reported in the book shed little light on this problem.

One of the most significant chapters deals with the background to the present standards set up for the daily requirements of vitamins. It seems that in truth, these requirements have never been established for man and that it has been only under conditions of particular stresses such as war-time that scientists have been called upon to utilize what knowledge they do have and set up requirements even though they may be substantially incorrect. It also appears that nothing resembling a daily requirement for a particular vitamin can

be set up because this requirement may change radically under the influence of exertion, illness and stresses of almost every sort. An example of this may be stated in regard to ascorbic acid whereas 10 mg. daily may cure some cases of scurvy, under some stress situations, 1,000 mg. daily would scarcely affect the plasma ascorbic level in another patient.

There is a chapter which reviews in some detail the progress of bringing to light the mechanism of action of the various hormones. Of these, the action of insulin is perhaps the best defined. However, "in no case have we penetrated the barrier which veils the basic mechanisms involved at the cellular level."

THE SHOULDER AND ENVIRONS. By James E. Bateman, M.D. Price, \$16.25. Cloth. Pp. 565, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1955.

This book is a complete coverage of shoulder disabilities — anomalies, diseases, and injuries. It begins with the embryology of the shoulder, considering the area between the spine and the humerus, and points out how congenital abnormalities develop. The anatomy of the shoulder is presented from the viewpoint of clinical examination, correlating surface anatomy with deep structures and roentgenographs, and comparing normal findings with the abnormal. Kinesiology, joint function, and the mechanics of common movement patterns are discussed. Pain mechanisms in the neck, shoulder, and upper extremity are correlated with diseases, injuries, and postural deviations.

The technic of obtaining a good history and physical examination of shoulder disabilities is outlined. This includes special radiographic technics.

The differential diagnosis of shoulder disorders is discussed, and followed by detailed coverage of the disorders under the headings of shoulder and neck pain, shoulder pain, shoulder pain with radiation, paralytic conditions, tumors, and fractures. Emphasis is on diagnosis and general treatment plan. Surgical procedures are described concisely.

The final chapter presents an estimated length of disability for various conditions and an assessment of degree of permanent disability.

The book can be used as a reference, because of its excellent table of contents and

good organization; but it is recommended for cover to cover reading, because of its pertinent application to physical medicine.

MUSCULAR CONTRACTION. By *M. Dubuisson*, Ph.D. Cloth. Price, \$6.50. Pp. 243, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

In the author's own words this monograph is limited to a discussion of two questions: 1) "What do we know about the chemical composition of muscle?" 2) "What happens when a muscle shortens and relaxes?" This book should be of value to both the newcomer and the experienced investigator in muscle physiology. The bibliography contains 764 references. According to the author, "the aim has been to assemble not all, but some of the important information on these subjects; to try to find out where we are, not to formulate a theory concerning muscular contraction." The main value of this book is as a compact source of factual information. The author makes frequent modest interpretations of the assembled information but directs little, if any, attention to speculation about unproved mechanisms. This only enhances the value of the book which is written by a competent and reliable investigator.

PROGRESS IN BIOPHYSICS AND BIOPHYSICAL CHEMISTRY. Vol. VI. Edited by *J. A. V. Butler*. Cloth. Price, \$9.50. Pp. 274, with illustrations. Pergamon Press Ltd., 122 E. 55th St., New York 22, 1956.

This is the sixth volume of a series of reports on biophysical investigations, which was started in 1951 under the joint editorship of *J. A. V. Butler* and *J. T. Randall*. It is with some regret that the reader learns that *J. T. Randall* found it necessary to retire from the editorship although the present sixth volume assures him of the continuance of the high standards of material and presentation set by its predecessors. Starting with volume VII, *B. Katz* of the Department of Biophysics, University College, London, will take *Randall's* place as co-editor. As in previous volumes the authors of the six chapters in the present volume are specialists in their fields who have been recruited from some of the foremost scientific institutions in England, Germany, Holland and the United States. A list of the titles of these chapters demonstrates the wide variety of subjects treated: "Protamines and Nucleoprotamines," "The Structure of Chromosomes," "The Donnan Equilibrium," "Biology and Biophysical Properties of Transforming Principles," "Biophysical Aspects of Neuro-Muscular Transmission," "Models for Biological Excitation Processes," "Physical Aspects of the Sense Organs." The information presented includes some of the fundamental studies and covers the progress

in research in the different fields. Illustrations and reference lists are excellent. All workers in the field of biophysics and borderline areas will highly value this additional volume of the series and look forward with interest to the publication of further volumes.

JOINT LIGAMENT RELAXATION TREATED BY FIBRO-OSSEOUS PROLIFERATION. By *George Stuart Hackett*, M.D. Cloth. Price, \$4.75. Pp. 97, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1956.

The author presents his concept that many chronic post-traumatic pains which are aggravated by use and motion are due to tearing of specific ligaments, particularly at their attachments to bone. He terms this condition "ligament relaxation," and he has been correcting it for the past 16 years by injection of a proliferating solution called "synsol" (*G. D. Searle & Co.*) into the affected ligaments, with good results. Two to four injections at 2-week intervals generally are required. About 5,000 injections are reported to have been made, presumably in 600 to 700 patients, without untoward effects. About 90 per cent of the patients have had complete relief. The diagnosis is made by finding tenderness in the involved ligaments on palpation in such a position that the overlying muscles are relaxed. It is confirmed at the time the needle is inserted into the ligament by the resultant reproduction of the local and referred pain. The author's experiences with the distribution of referred pain from various ligaments are of interest. Six pages are devoted to experiments on rabbits, in which tendons are used rather than ligaments.

The book is marred by considerable repetition and poor organization of material. Occasional errors in spelling and other editorial anomalies are encountered. A series of 24 case reports concludes the book. Some of these are enlightening, but the information in five of them is extremely sketchy, with even the diagnosis and location of the injections being omitted. *Dr. Hackett's* ideas may have considerable merit but his book does not do them justice.

THE HISTORY AND CONQUEST OF COMMON DISEASES. Edited by *Walter R. Bett*, M.R.C.S. Cloth. Price, \$4.00. Pp. 334. The University of Oklahoma Press, Norman, Okla., 1954.

This delightful book has been prepared by 18 distinguished physicians or surgeons. Each contributor has discussed the history and conquest of one disease or group of diseases. The 17 chapters deal with the following subjects: acute communicable diseases, influenza, pneumonia, tuberculosis, rheumatism, arthritis, heart disease, *Bright's* disease, tonsils

and adenoids, venereal diseases, rickets, diseases of the endocrine glands, gallstones, appendicitis, epilepsy, cancer and malingering.

Dr. Bett mentions in the preface that it was the intention to provide a book "mainly for patients, but also for the medical profession." Anyone who enjoys history will enjoy reading this book. Furthermore, it is an authoritative reference volume for the physician who wishes information on the history of any of the diseases that are included. It will be pleasant reading for all medical historians, professional or amateur.

LOVE AND HATE IN HUMAN NATURE. By *Arnold A. Hutschnecker, M.D.* Cloth. Price, \$3.50. Pp. 278. Thomas Y. Crowell Company, 432 Fourth Ave., New York 16, 1955.

The book is divided into three sections designated The Self, The Group, The Future. The author takes the theme of ambivalence—mixed love and hate—as enunciated by Bleuler for the manifest theme of the book. He intersperses many examples from his own clinical experience. In the second part he continues this theme, giving it the more orthodox Freudian character of aggressive-libidinal drives. In part three he attacks the problems of world education and world peace, noting the threats of misunderstood individual drives and poorly-ordered group reactions.

This volume is for laymen or rather directed at universal consumption. At first it appears to be another popularized psychology book for the masses. Instead the preoccupation of the author is with the problem of world peace, which he hopes may arrive some day through the efforts of psychologists, psychiatrists and teachers, perhaps through the agency of UNESCO.

The volume cannot be recommended as a technical treatise for physicians and does not appear profound enough to be a blue-print for achieving world peace. One cannot however condemn its methods or objectives.

HYPNOTIC SUGGESTIONS. Its role in Psychoneurotic and Psychosomatic Disorders. By *S. J. Van Pelt, M.B., B.S.* Cloth. Price, \$2.75. Pp. 95. Philosophical Library, Inc., 15 E. 40th St., New York 16, 1956.

The author sets forth succinctly his theory that (1) hypnotic suggestion plays a major role in the etiology of psychoneuroses and that (2) therefore his original method of Relaxation, Realization, and Re-education, using only light hypnosis and suggestion, is the rational treatment for the psychoneuroses.

The author's defense of these propositions is well written. It is illustrated with 12 case histories. These are open to at least two criticisms, namely that patients' complaints like "insomnia" and "frigidity" should not be called "referring doctor's diagnosis" and that

the possibility of an organic basis for the complaint should be considered explicitly in each case.

The book does not answer some questions that will trouble the critical reader. The protagonist for hypnotism needs to dissociate himself rather emphatically from the charlatans recently exposed, for instance by Norma Lee Browning in the *Chicago Daily Tribune*. This contribution by Van Pelt must therefore be regarded as a statement of conviction without complete proof.

1956 MEDICAL PROGRESS. A Review of Medical Advances During 1955. By *Morris Fishbein, M.D.* Vol. IV. Cloth. Price, \$5.50. Pp. 389. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, 1956.

This is the fourth volume of a series designed to review the progress made in medicine during the preceding year. Twenty-nine outstanding medical experts present advances in the following fields: medicine, allergy, rheumatic diseases, diabetes, gynecology, gastroenterology, laboratory procedures, general surgery, ophthalmology, poliomyelitis vaccine, neurology, physical medicine and rehabilitation, dermatology, nutrition, cardiovascular disease, psychiatry, neuropsychiatry, new drugs, endocrinology, ear, nose, and throat, and orthopedic surgery.

According to Fishbein, "The most exciting announcements of medical progress in the year just passed included the establishment of the Salk vaccine against poliomyelitis, the development of ataractic agents which produce freedom from confusion and produce peace of mind, the appearance of several new antibiotics with remarkable properties, and the report from Germany of a new substance to be taken by mouth for control of blood sugar."

"During this year also prednisone was developed as a product preferable to cortisone for many conditions. Our knowledge of surgery of the heart advanced so that all four valves have been approached surgically. Such extraordinary observations have been made as the fact that scabies is gradually disappearing as a disease. New anticonvulsants and antispasmodics are offering benefit in Parkinson's disease and epilepsy. The mechanism of heartburn became better understood. The location of tumors of the brain through the use of radioactive substances reached an efficiency of some 75 per cent. A tryptic agent was applied to causing the early disappearance of 'black eye'. A dye substance was developed which when swallowed in tablet form gave indication of presence or absence of free acid in the stomach, eliminating the use of the stomach tube for this purpose." These are only a few of the interesting developments described in this fine review of medical progress.

Of special interest to the readers of the *Archives of Physical Medicine and Rehabilitation* will be the chapter on physical medicine and rehabilitation by Gordon Martin. In this chapter he discusses the great demand for physicians trained in this specialty and mentions that 53 institutions now provide approved residencies in the specialty. Martin states that "during the past year interesting developments have been made in the treatment of patients having rheumatoid arthritis, cerebral palsy, and amputations. Of the procedures used in physical medicine, new information is available concerning microwave diathermy and ultrasonic diathermy. The scope of the former extends to other medical fields than those concerned with therapy."

Martin discusses new developments in the use of microwave and ultrasonic diathermy and new methods of physical treatment of chronic pulmonary emphysema, arthritis, cervical and shoulder problems, arthroplasty of the hips, cerebral palsy, amputees, peripheral vascular disease, poliomyelitis, neuropsychiatric disease and speech disturbances. He also discusses therapeutic exercise, electrodiagnosis and electrotherapy, and rehabilitation centers and programs.

Any physician can profit by reading this well-prepared and authoritative recitation of medical progress during 1955.

POLIOMYELITIS—PAPERS AND DISCUSSIONS PRESENTED AT THE THIRD INTERNATIONAL POLIOMYELITIS CONFERENCE. Compiled and edited for the International Poliomyelitis Congress. Cloth. Price \$7.50. Pp. 567, with illustrations. J. B. Lippincott Company, E. Washington Sq., Philadelphia 5, 1955.

At the time of the Third International Conference on Poliomyelitis in Rome in the fall of 1954, the value of the Salk vaccine had not yet been established, although 400,000 human subjects had received injections the previous spring. Now that the vaccine has definitely proved its value, certainly in the reduction of incidence of paralytic polio, one might wonder whether volumes such as the present one are of any value. The answer is that neither the prevention of polio nor its management has yet reached a stage where the last word has been said.

This present volume on poliomyelitis represents the latest thoughts on the subject by experts in the field of epidemiology, medical treatments in the various stages, orthopedic management, and physical medicine and rehabilitation.

A brief enumeration of the contents will give the reader an idea of the vast coverage of the various problems associated with poliomyelitis. The first section deals with Social Aspects of Poliomyelitis in Italy, Scandinavia and the United States; under Acute Care, are discussed Differential Diagnosis; Systemic

Treatment; Basic Physiology of Respiration; Treatment of Respiratory Difficulty, and Treatment of the Acute Stage with Brain Stem Involvement and Respiratory Failure. Infection and Immunity are discussed by six experts including Doctors Salk and Sabin who have contributed so much to this field. Dr. Enders, Nobel Prize winner has a chapter on Developments in Tissue Culture. Then follow sections on Orthopedics, Physical Medicine and Rehabilitation, and Trends in Polio. A description of Scientific Exhibits embraces the last section of the volume. Illustrations, graphs, and statistical tables increase the general value of this interesting volume.

The book is highly recommended to physiatrists, therapists, nurses, and all others who have any interest in this field.

VARICOSE VEINS. Phlebitis, Leg Ulcers, Dropsy, Eczema, Haemorrhoids. By R. Rowden Foote, M.D. Cloth. Price, \$2.25. Pp. 110, with illustrations. Henry Regnery Company, 20 W. Jackson Blvd., Chicago 4, 1955.

In this volume is discussed the subject of varicose disease, anatomy, physiology, diagnosis, and treatment in a very adequate manner.

The author discusses the pathogenesis of varicose veins and varicose ulcers, and describes every-day care of feet and legs that can help to prevent complications of this all prevalent condition. The rationale of medical and surgical types of treatment is carefully delineated. The illustrations are adequate and easily understandable to the intelligent layman. A glossary at the end of the book defines the more difficult medical terms. Although written primarily for the public, this book will be of value to members of the medical and allied professions.

ADVANCES IN CANCER RESEARCH. Vol. III. Edited by Jesse P. Greenstein, and Alexander Haddow. Cloth. Price, \$8.50. Pp. 369. Academic Press Inc., Publishers, 125 E. 23rd St., New York 10, 1955.

This volume, which is the third of a series on cancer research, consists of six articles covering many aspects of this field. The first paper, by Richard Doll of England, gives an extensive review of the etiology of cancer of the lung including material on the effect of tobacco. The author has provided information for and against the theory that cigarette smoking is a cause of cancer of the lung.

The paper by Harold Morris of the National Institutes of Health, Bethesda, Md., is a review of the problem of development and metabolism of thyroid tumors.

Michael B. Shimkin, also of the National Institutes of Health, reported on primary pulmonary neoplasms in animals from 1896 to 1953. Electronic structure and carcinogenic

activity of aromatic molecules by Pullman and Pullman of Paris covers theories of the mechanism of action of the carcinogenic molecules. P. Rondoni of the Cancer Institute of Milan, Italy, discussed the regressive aspects of cancer. Pulmonary tumors in experimental animals also are described by Michael Shimkin. A report on oxidative metabolism of neoplastic tissues by Sidney Weinhouse of the Lankenau Hospital Research Institute and the Institute in Cancer Research, Philadelphia, completes the book.

The material is of special value to workers in the field of cancer research or a related field.

ASPECTS OF SYNTHESIS AND ORDER IN GROWTH. Edited by *Dorothea Rudnick*. Cloth. Price, \$6.00. Pp. 274. Princeton University Press, Princeton, N. J., 1955.

This volume consists of the written versions of papers presented at the Thirteenth Symposium of the Society for the Study of Development and Growth held at Dartmouth College, Hanover, N. H. on June 23-26, 1954.

These reports of new researches in the wide field of growth studies begin with an essay on duplication of molecules by Linus Pauling. Joseph Fruton considers the synthesis of proteins in living organisms; Roger Stanier reviews recent work on so-called adaptive enzymes in microbes; James Ebert discusses the synthesis of specific proteins in the chick embryo; Elizabeth Russell and Seymour Cohen analyze the effects of genes and viruses on growing systems; Sterling Hendricks and Harry Barthinick contribute studies on light as a growth controlling factor.

In the field of morphogenesis, Ralph Emerson reviews important work on water moulds; Nelson Spratt reports new and unexpected discoveries on cellular movements in the development of the chick; Clifford Grobstein writes on tissue differentiation, and Dietrich Bodenstein reviews studies of insect hormones as affecting growth and development.

LABORATORY AIDS IN ENDOCRINE DIAGNOSIS. By *Roberto F. Escamilla*, M.D. Cloth. Price, \$4.75. Pp. 131, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1954.

It is the intent of this book to present in outline form laboratory tests and procedures which have proved to be of clinical value in the various endocrine diseases.

The volume is divided into chapters, each covering one type of test in a brisk, concise fashion. In the final chapter this data is recapitulated in the form of a Disease Index, listing the endocrine diseases and under these headings, the appropriate laboratory findings.

There is a surprisingly complete coverage of laboratory methods. It is an up-to-date

book, which presents the most recent as well as the simplest, adequate method for each test. This book is not written primarily for the endocrinologist. It will have great usefulness for the general practitioner, the internist and the gynecologist and would be a useful addition to the library of any hospital laboratory.

ANNUAL REVIEW OF PHYSIOLOGY. Vol. 18. Edited by *Victor E. Hall*. Paper. Price, \$7.00. Pp. 591. Annual Reviews, Inc., Stanford, Calif., 1956.

This review compiles the pertinent literature in the various fields of physiology for the previous year. The authors who have been asked to contribute the various sections are men pre-eminent in their field. This volume is especially valuable as a reference source for persons interested in the various aspects of physiology. To the physiologist, the sections on the physiology of connective tissue, muscle, peripheral circulation, somatic functions of the nervous system, higher functions of the nervous system, and energy metabolism will be of particular interest. For any teaching or research program or for any physiologist who wishes to remain at the forefront of his field this is a valuable book.

DIE PHYSIK UND IHRE ANWENDUNG IN BIOLOGIE UND MEDIZIN. Band 1: Mechanik, Akustik Und Wärme. By *Walter Beier*, and *Erich Dörner*. Cloth. Price, 35 DM. Pp. 368. Georg Thieme, Leipzig C 1, Germany, 1956.

The demand of long standing by students working in the fields of biology and medicine for a textbook on physics with illustrations and examples taken from their fields rather than from the customary fields of mechanics and engineering has in recent years been filled by the publication of several physics books written for the medical student. The present volume is a new addition to this group. It was written by a physicist (W. B.) and a physician (E. D.), both of the University of Leipzig in East-Germany. The text follows in general the standard pattern of books on physics and the first volume comprises sections on mechanics, acoustics and heat. Numerous illustrations of the application of physical principles to medicine are scattered throughout the text. Detailed descriptions are given, for example, of the behavior of the human organism under high accelerations; of methods to measure blood pressure; of the statics of the human skeleton; of heart catheterization, of ultracentrifugation; of osmosis; of the theory of hearing, and many others. The section on mechanics is preceded by an introductory chapter describing illusions of the senses, notably optical illusions, a description of the "physical method" of approach to a problem, and a detailed chapter on physical units and meth-

ods of measurement, accuracy and sources of error. Condensed information on trigonometry, functions, differential quotients, integral calculus and a series of tables with physical constants is presented in the appendix. The book is well written and the illustrations—for the greater part line drawings—are excellent. A list of references contains one Swiss and 25 German publications. Strangely, none of the growing number of American books on the subject of medical physics is cited.

PRACTICAL NEUROLOGY. By *Leo M. Davidoff, M.D., and Emanuel H. Feiring, M.D.* Cloth. Price, \$7.00. Pp. 442. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, 1955.

Doctors Davidoff and Feiring are specialists in neurological surgery. Their book, *Practical Neurology*, is one of a series of handbooks intended as a concise clinical reference guide in neurology for the physician engaged in general practice.

In the preface, the authors state that they are aware that this is not an encyclopedic reference book. They do however, attempt to cover the field and even though they omit sec-

tions on anatomy and physiology, they have undertaken a real task in the space of a handbook.

The book is printed in a large easily read type. It is without any illustrations or diagrams. There is no bibliography. Brevity is the key-note of this book. It will serve the generalist and student in many situations but it is the opinion of this reviewer that the generalist of today will in many instances need more information than is provided.

The special field of physical medicine and rehabilitation is not handled well. For example, in the discussion of treatment of muscular dystrophy the following statement appears: "Unfortunately there is no specific treatment. Exercise, massage and orthopedic care of joints which tend eventually to become fixed in abnormal postures, may be helpful." A greater emphasis might be placed on testing and training the patient to make most effective use of his total capacities in the social and educational spheres even though his disease progresses.

The book has value in its brevity and can be effectively used by physicians and students for ready reference to many neurological conditions.

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IMPORTANT ANNOUNCEMENT

The Executive Board of the American Institute of Ultrasonics in Medicine has voted to cancel the planned scientific program for September 8, 1956, at Atlantic City and place all emphasis on a two-day International Meeting to be held in Los Angeles, California, in 1957, immediately preceding the American Congress of Physical Medicine and Rehabilitation.

The Executive Board has furthermore indicated that biennial meetings would be more beneficial in the presentation of clinical and research work in the field of ultrasonics; therefore the Board has decided that the first biennial meeting will begin with the International Meeting of 1957.

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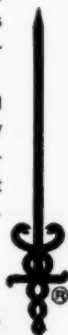
In cities, towns and villages all over America, the ringing of church bells one day in April will mark the launching of the annual Cancer Crusade of the American Cancer Society. At the same time, in many doctors' offices, the staccato ring of door and telephone bells will mark the success of a major objective of the Society.

"Fight Cancer with a Checkup" is the American Cancer Society's immediate, short-range answer to the terrible toll of lives taken each year by this dread disease. It is to your office that the Society is urging the public to go for the periodic examinations that can mean the early detection and prompt treatment of cancer, and could prevent thousands and thousands of needless deaths.

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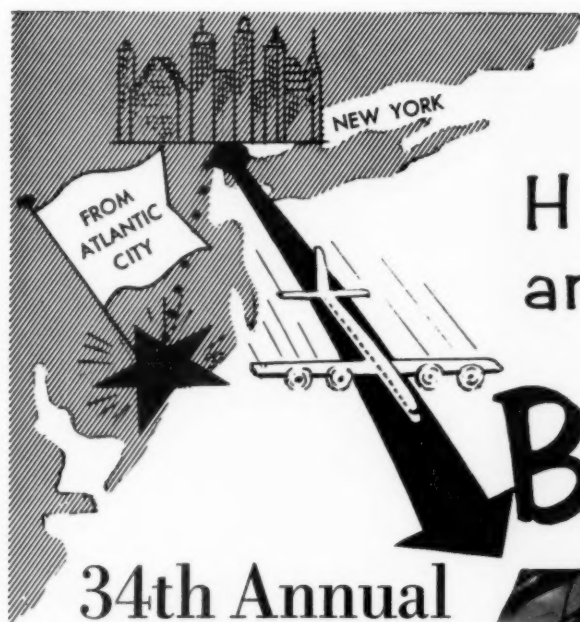
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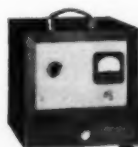
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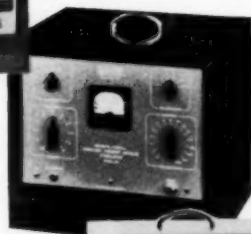
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